LASER ANNEALING APPARATUS AND LASER ANNEALING METHOD

ABSTRACT

The present invention allows a semiconductor film to be uniformly crystallized by laser annealing.

A laser annealing apparatus according to the present invention includes a pulsed laser oscillator to output a pulsed laser beam and an optical transmission means to transmit the pulsed laser beam output from the pulsed laser oscillator to irradiate a semiconductor film with the pulsed laser beam, wherein the pulsed laser beam is irradiated on the semiconductor film in a condition where an effective power density calculated by a formula of effective power density ($J/(sec \cdot cm^3)$) = pulse energy density (J/cm^2) / pulse width (sec) × absorption coefficient of semiconductor film (cm^{-1}) falls within a range of from 3×10^{12} to 1.5×10^{12} on an irradiated surface of the semiconductor film. In this way, the semiconductor film can be crystallized without inducing abnormal crystal growth resulting from complete melting of the semiconductor film, so that uniform crystals with small variability can be obtained.

Fig. 7