ABSTRACT

A blank mask and the like are disclosed, which comprises a transparent substrate, a phase shift film disposed on the transparent substrate, and a light shielding film disposed on the phase shift film. ~~–~~A Photon energy of incident light in a point having a Del_2 value of 0 is 3.8 eV to 4.64 eV, when PE_1 value is 3.0 eV and PE_2 value is 5.0 eV. ~~The blank mask has a TFT1 value of 0.25 μm/100 °C or less expressed by Equation 1 below.~~ ~~–~~It can help manufacture a semiconductor device having a minute line width easily.

~~[Equation 1]~~

$$\sim\sim TFT1 = \frac{\Delta PM}{T2 - T1}\sim\sim$$

~~where, when the thermal variation of a processed blank mask, which is processed with a method described in the Specification, is analyzed in a thermomechanical analyzer at increasing temperature from T1 to T2, and ΔPM is a position change of the upper surface of the phase shift film in the thickness direction at T2, based on a position of the upper surface of the phase shift film at T1.~~

FIG. 1