

ABSTRACT

5 Provided is a phase shift mask blank including a substrate, and a phase shift film
thereon, the phase shift film composed of a material containing silicon and nitrogen and
free of a transition metal, the phase shift film including at least one compositionally graded
layer having a composition continuously varying in a thickness direction, and a refractive
index n and an extinction coefficient k , with respect to exposure light, varying in the
10 thickness direction, the exposure light being KrF excimer laser, the compositionally graded
layer having a difference between a maximum refractive index $n(H)$ and a minimum
refractive index $n(L)$ of up to 0.40, and a difference between a maximum extinction
coefficient $k(H)$ and a minimum extinction coefficient $k(L)$ of up to 1.5.

[Fig. 1A]