

SEMI D84-0823

TERMINOLOGY FOR FPD PHASE SHIFT MASK AND MASK BLANKS

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1 Purpose

1.1 This Standard defines the terminology for FPD phase shift masks and mask blanks.

2 Scope

2.1 This Standard applies to phase shift masks and mask blanks that are principally used in fabricating flat panel displays.

NOTICE: SEMI Standards and Safety Guidelines do not purport to address all safety issues associated with their use. It is the responsibility of the users of the Documents to establish appropriate safety and health practices, and determine the applicability of regulatory or other limitations prior to use.

3 Referenced Standards and Documents

3.1 None.

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

4 Definitions

4.1 General

4.1.1 *phase shift mask* — a photomask designed to increase resolution and depth of focus through the control of the phase angle. Also referred to as ‘PSM’ for short.

4.1.2 *attenuated phase shift mask* — a photomask designed to increase resolution and depth of focus through the control of light transmittance and phase angle. This is done against a transparent part by replacing a conventional opaque pattern with a partially transmitted film (attenuated shifter film) that controls light phase angle and transmittance. Also referred to as ‘halftone phase shift masks’ and ‘attPSM’ for short.

4.1.3 *attenuated phase shift mask blanks* — a mask blanks for making attenuated phase shift masks.

4.1.4 *shifter film* — an optical film to control phase angle and light transmittance. Also referred to as ‘attenuated shifter film’.

4.1.5 *multitone mask* — a mask with three or more tones, such as white-gray-black. There is no function for phase shift. This is used to reduce the patterning process of TFT array for FPD, etc.

4.1.6 *half tone mask* — a type of multi tone mask. A half tone film with no phase shift function is placed in the gray area. To distinguish it from the half tone phase shift mask, it is also referred to as stacked layer mask (SLM).

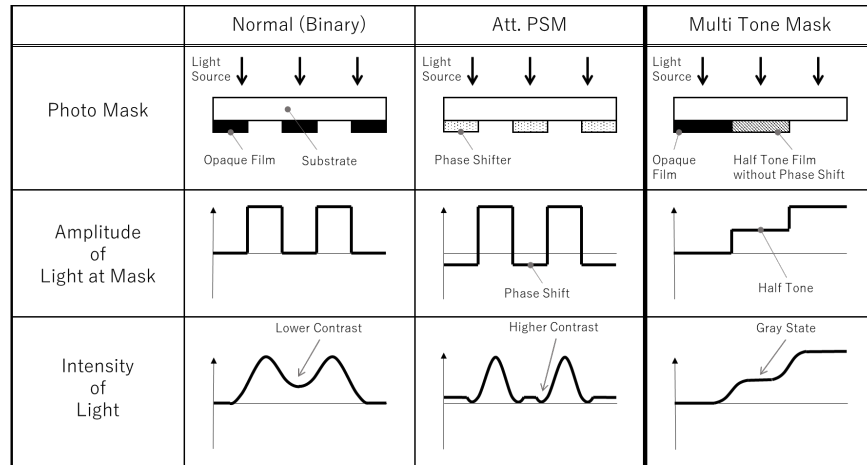


Figure 1
Structure of Each Mask Types

4.2 Structures

4.2.1 *single-layer phase shift mask* — an attenuated phase shift mask having a thin film of the same material composition, to give a certain phase angle and transmittance. It is also referred to as ‘Only PSM’.

4.2.2 *double-layer phase shift mask* — an attenuated phase shift mask including an opaque area inside the exposure area. A phase shifter film is stacked on top or bottom of an opaque film.

4.2.2.1 *top-type (double-layer) phase shift mask* — an attenuated phase shift mask including an opaque area inside the exposure area. A phase shifter film is stacked on top of an opaque film.

4.2.2.2 *bottom-type (double-layer) phase shift mask* — an attenuated phase shift mask including an opaque area inside the exposure area. A phase shifter film is stacked on bottom of an opaque film.

4.2.2.3 *phase shift alignment error* — a placement error between phase shift layer and opaque film layer, for double-layer phase shift masks.

4.2.3 *phase shift and half tone mask* — Single-layer phase shift mask or double-layer phase shift mask with the added function of half tone mask. It is referred to as PHM for short. It is also referred to as “stacked layer & phase shift mask” (SPM) and “phase shift & stacked layer mask” (PSLM).

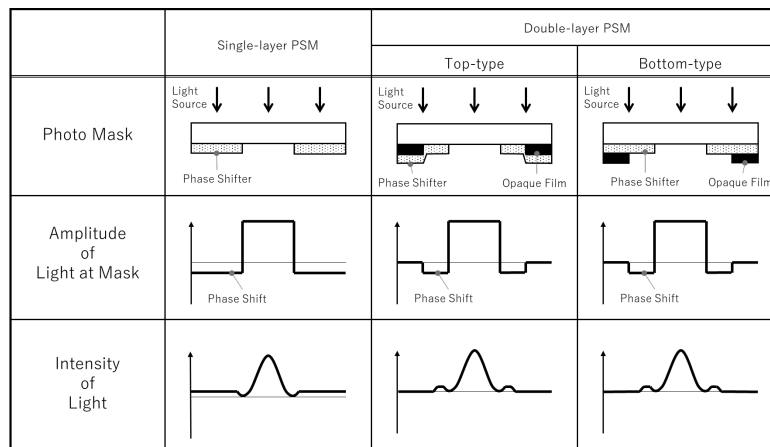


Figure 2
Structure of Each Phase Shift Mask Types