

# One-dimensional PSD

## S8543

Long, narrow active area and surface mountable package



S8543 is a one-dimensional PSD with a long, narrow active area sealed in a surface mountable chip carrier package. The active area of  $0.7 \times 24$  mm delivers excellent position detection characteristics. Hamamatsu also provides L5586 infrared LED compatible with S8543.

### Features

- Long, narrow active area:  $0.7 \times 24$  mm
- Chip carrier package for surface mount ( $t=1.36$  mm)
- Excellent position detection characteristic and resolution

### Applications

- Position detection of optical pickup head
- Distance measurement
- Displacement measurement
- Position detection, etc.

#### ■ Absolute maximum ratings ( $T_a=25$ °C)

Parameter	Symbol	Value	Unit
Reverse voltage	$V_R$ Max.	7	V
Operating temperature	$T_{opr}$	-10 to +75	°C
Storage temperature	$T_{stg}$	-20 to +80	°C

#### ■ Electrical and optical characteristics ( $T_a=25$ °C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Spectral response range	$\lambda$		-	320 to 1100	-	nm
Peak sensitivity wavelength	$\lambda_p$		-	960	-	nm
Photo sensitivity	S	$\lambda=\lambda_p$	-	0.58	-	A/W
Dark current	$I_D$	$V_R=5$ V	-	1	15	nA
Rise time	$t_r$	$R_L=1$ k $\Omega$ , $V_R=5$ V $\lambda=780$ nm, 10 to 90 %	-	20	50	$\mu$ s
Terminal capacitance	$C_t$	$V_R=5$ V, $f=10$ kHz	-	65	130	pF
Interelectrode resistance	$R_{ie}$	$V_b=0.1$ V	100	140	180	k $\Omega$
Position detection error	E	$\lambda=900$ nm, $V_R=5$ V $\phi 200$ $\mu$ m *1	-	$\pm 50$	$\pm 250$	$\mu$ m
Position resolution	$\Delta R$	$I_o=1$ $\mu$ A, $B=1$ kHz *2	-	0.6	-	$\mu$ m
Saturation photocurrent *3	$I_{st}$	$V_R=5$ V	200	-	-	$\mu$ A

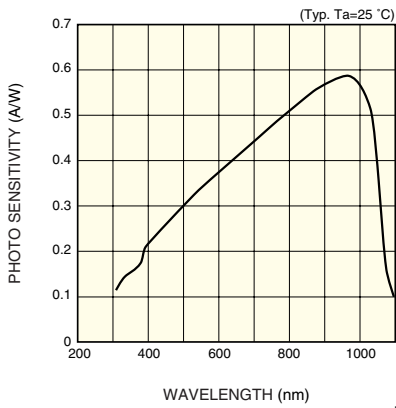
\*1: Within  $\pm 75$  % from center to end of active area

\*2: This is the minimum detectable light spot displacement. The detection limit is indicated by the distance on the photosensitive surface. The numerical value of the resolution of a position sensor using a PSD is proportional to both the length of the PSD and the noise of the measuring system (resolution deteriorates) and inversely proportional to the photocurrent (incident energy) of the PSD (resolution improves). The resolution value listed in this data sheet was calculated under the following conditions.

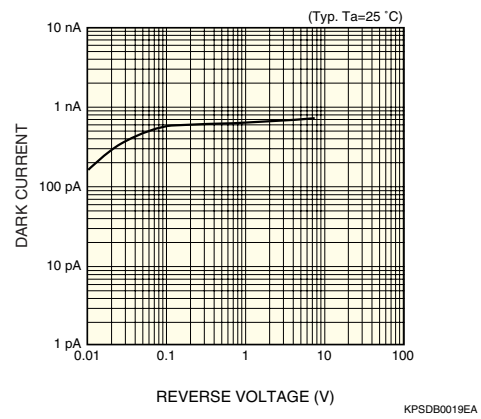
- Frequency bandwidth: 1 kHz
- Photocurrent: 1  $\mu$ A
- Equivalent input noise voltage of circuit: 1  $\mu$ V (1 kHz)
- Interelectrode resistance: Typical value (refer to the specification table)

\*3: This is the upper limit of photocurrent linearity. The upper limit is defined as a point where the photocurrent output deviates 10 % from the linearity.

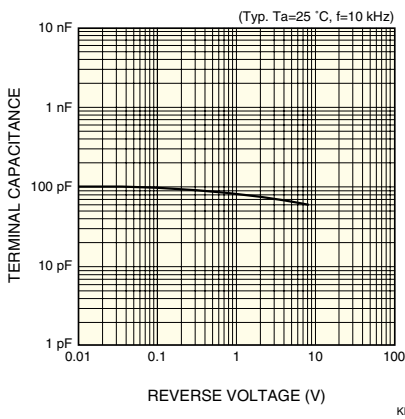
■ Spectral response



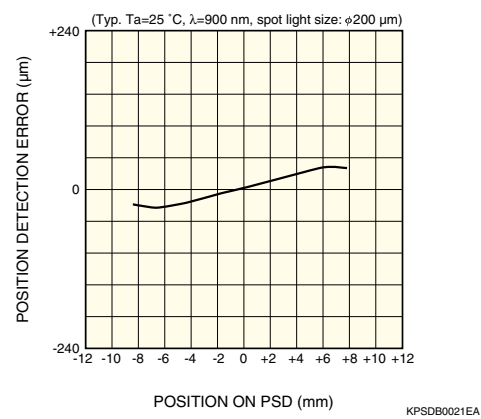
■ Dark current vs. reverse voltage



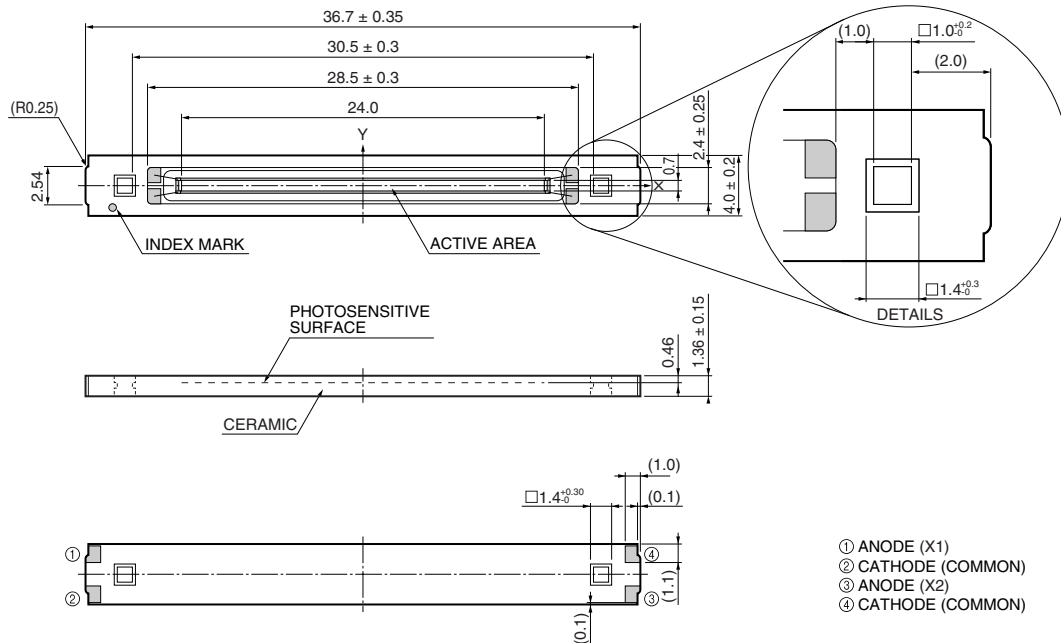
■ Terminal capacitance vs. reverse voltage



■ Position detection error



■ Dimensional outline (unit: mm)



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