SHARP

PD3151F

Position Sensitive Detector with Location Hole (PSD *)

■ Features

1. Easy high accuracy positioning owing to location hole
   Detecting portion pattern positional accuracy : ± 0.1 mm
2. Thin, compact package
3. Visible light cut-off type

■ Applications

1. Cameras

   * PSD: Position Sensitive Detector

■ Outline Dimensions   (Unit : mm)

Chip positional accuracy : ± 0.1 mm, Rotational deviation : ± 2 °

① Anode A
② Cathode
③ Cathode
④ Anode B
⑤ Cathode
⑥ Cathode
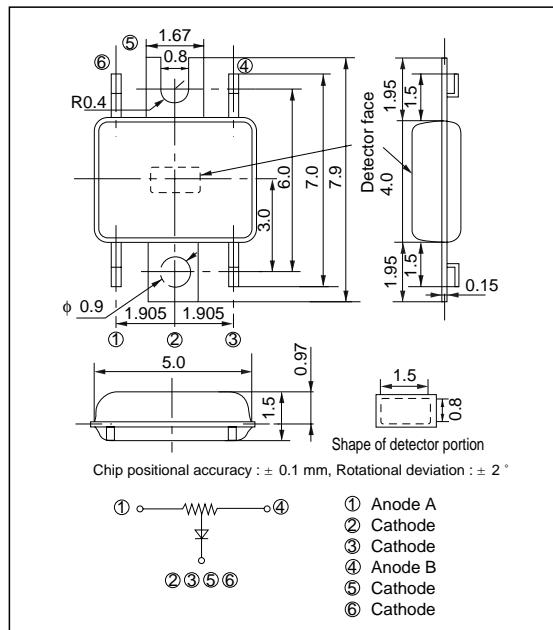
■ Absolute Maximum Ratings   (Ta=25°C)

Parameter	Symbol	Rating	Unit
Reverse voltage	V_R	30	V
Operating temperature	T_{opr}	- 25 to + 85	°C
Storage temperature	T_{stg}	- 40 to + 85	°C
*1 Soldering temperature	T_{sol}	+ 260	°C

*1 For MAX. 3 seconds in the soldering area

Soldering area
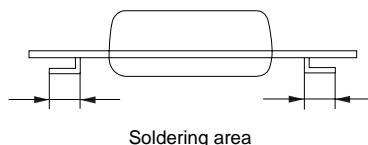
■ Electro-optical Characteristics

(Ta=25 ˚C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Reverse voltage	V_R	$I_R = 10\mu$ A	30	-	-	V
Dark current	I_d	$V_R = 1V$	-	-	1.5	nA
Collector current	*2 I_L	$V_R = 1V$, $E_V = 1000$ lx	6	10	-	μ A
Terminal capacitance	C_t	$V_R = 1V$, $f = 10kHz$	-	10	30	pF
Peak sensitivity wavelength	λ_P	-	-	940	-	nm
Sensitivity wavelength range	λ	-	770	-	1130	nm
Response time	*3 t_r , t_f	$V_R = 1V$, $R_L = 1k\Omega$	-	5	30	μ s
Resistance between electrodes	Rie	$V_R = 1V$, $V_a = 0.5V$	320	400	480	kΩ
Error of position detection	*4 -	-	-	-	±25	μ m
Sensitivity	R	-	-	0.5	-	A/W
Forward voltage	V_F	$I_F = 1mA$	-	-	1.0	V

*2 $I_L = I_1 + I_2$

　　where, I_1 and I_2 are collector current of A1 and A2 respectively.

　　Ev : Illuminance by CIE standard light source A (tungsten lamp)

*3 Test circuit for response time is shown below.

Input

Laser diode
$\lambda = 830nm$

$R_L = 1k\Omega$

V_R　　V_R

Input

Output

90%
10%

t_r　　t_f
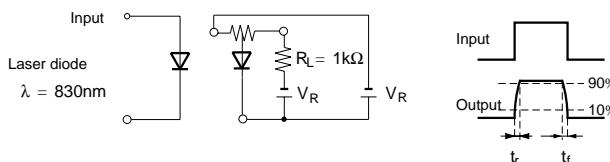
*4 75% area from detecting portion center to the edge of detecting portion

　　Definition of error of position detection

　: Error of position detection of each incident light position is defined by the following formula, if electrical center position is $I_1 = I_2$.

$$\text{Error of position detection (}\mu\text{m)} = \frac{L}{2} \times \frac{I_1 - I_2}{I_1 + I_2} - \text{ Incident light position (}\mu\text{m)}$$

　　L : Length of light detector surface =1.5mm

Fig. 1 Spectral Sensitivity
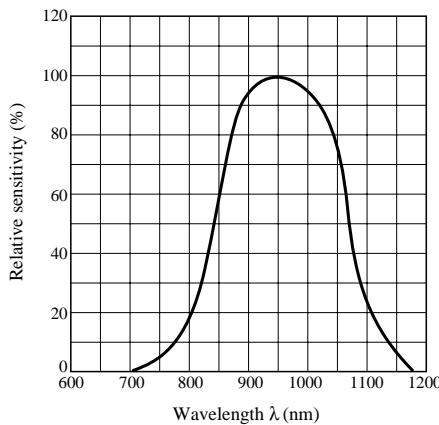
## Fig. 2 Dark Current vs. Ambient Temperature
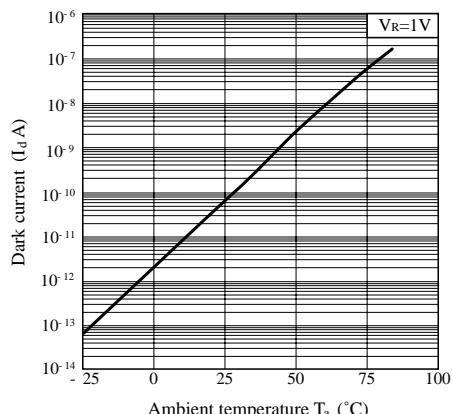
Fig. 3 Dark Current vs. Reverse Voltage

Dark current I_d (A) vs. Reverse voltage V_R (V), Ta=25°C
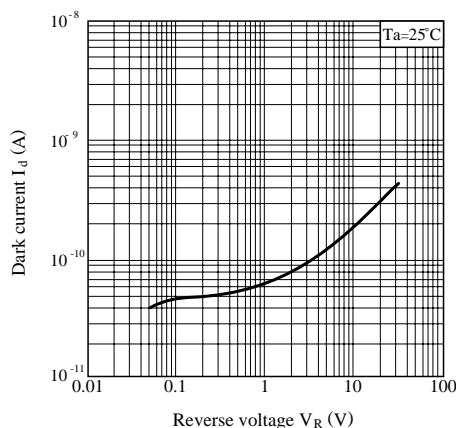
Fig. 4 Terminal Capacitance vs. Reverse Voltage

Terminal capacitance C_t (pF) vs. Reverse voltage V_R (V), f=10kHz, Ta=25°C

Fig. 5 Relative Output vs. Ambient Temperature
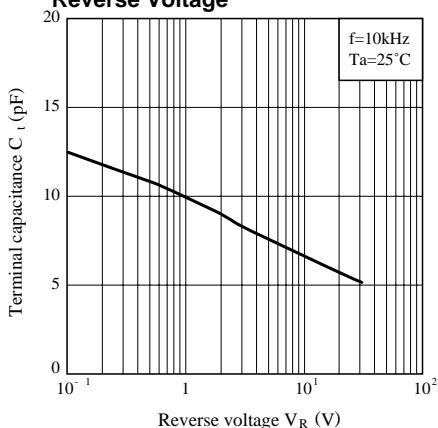
Relative output (%) vs. Ambient temperature T_a (°C)
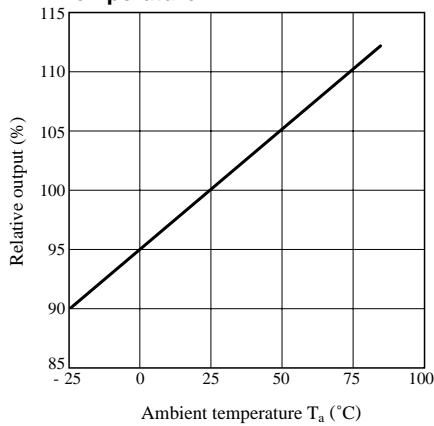
Fig. 6 Collector Current vs. Illuminance

Collector current I_L (μA) vs. Illuminance E_V (lx), V_R=1V, Ta=25°C
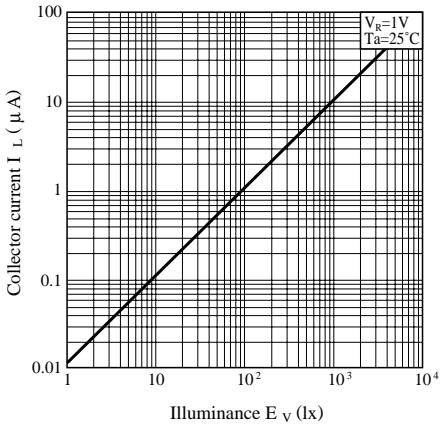
● Please refer to the chapter "Precautions for Use". (Page 78 to 93)