



P11159-201AS

## Small package and high resolution encoder module

The P11159-201AS is an optical encoder module that consists of a photo IC and red LED. The photo IC incorporates a 4-element photodiode and a 2-phase digital signal output circuit. When using 0.2 mm pitch slits, the P11159-201AS produces a 2-phase digital signal output matching the slit movement.

### Features

- High resolution: 0.05 mm (2-phase output)
- Positioning pin for easy alignment
- Small package
- Suitable for lead-free flow soldering

### Applications

- Rotary encoder
- Linear encoder

### Absolute maximum ratings (Ta=25 °C)

	Parameter	Symbol	Value	Unit
Input (LED)	Forward current*1	IF max.	25	mA
	Reverse voltage	VR max.	5	V
	Power dissipation	P	100	mW
Output (photo IC)	Supply voltage	Vcc max.	-0.5 to +7	V
	Output voltage	Vo max.	-0.5 to Vcc + 0.5	V
	Output current	Io max.	4	mA
	Power dissipation*2	P	250	mW
Operating temperature		Topr	-40 to +85	°C
Storage temperature		Tstg	-40 to +90	°C
Soldering		Tsol	260 °C, 3 s Max., at least 1 mm away from case surface	

\*1: Forward current decreases at a rate of 0.5 mA/°C above Ta=55 °C

\*2: Power dissipation decreases at a rate of 3.1 mW/°C above Ta=25 °C

Note: The P11159-201AS is not suitable for reflow soldering.

Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

### Electrical and optical characteristics (Ta=25 °C, Vcc=5 V, unless otherwise noted)

	Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input (LED)	Forward voltage	VF	IF=10 mA	-	1.9	2.4	V
	Reverse current	IR	VR=5 V	-	-	10	µA
	Peak emission wavelength	λp	IF=10 mA	-	650	-	nm
Output (photo IC)	Operating supply voltage	Vcc		3.0	-	7.0	V
	Low level output voltage	VOL	IoL=1 mA	-	-	0.4	V
	High level output voltage	VOH		4.5	-	-	V
	Supply current	Icc	VOA=VOB=L	-	6.0	10	mA
Transfer characteristics	Duty ratio*3	tAH/tAP	IF=5 mA, f=10 kHz	35	50	65	%
		tBH/tBP		35	50	65	%
	Phase difference*3	θAB	IF=5 mA, f=10 kHz	60	90	120	degree
	Rise time	tr	IF=5 mA, CL=10 pF	-	0.5	2	µs
	Fall time	tf	IF=5 mA, CL=10 pF	-	0.04	0.3	µs
Maximum response frequency*3 *4		f max.	IF=5 mA	50	-	-	kHz

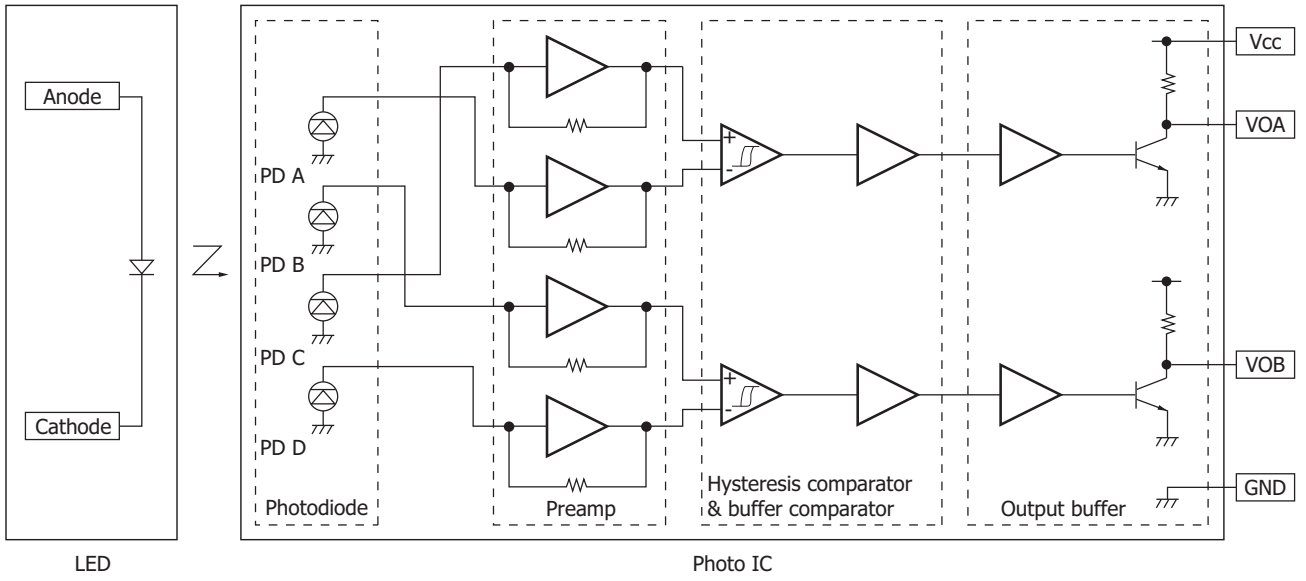
\*3: Measured when recommended slits are used in specified position

Response frequency f is the reciprocal of the time required to move one pitch.

\*4: Maximum frequency at which no error occurs in the output transition sequence (See operation timing diagram.)

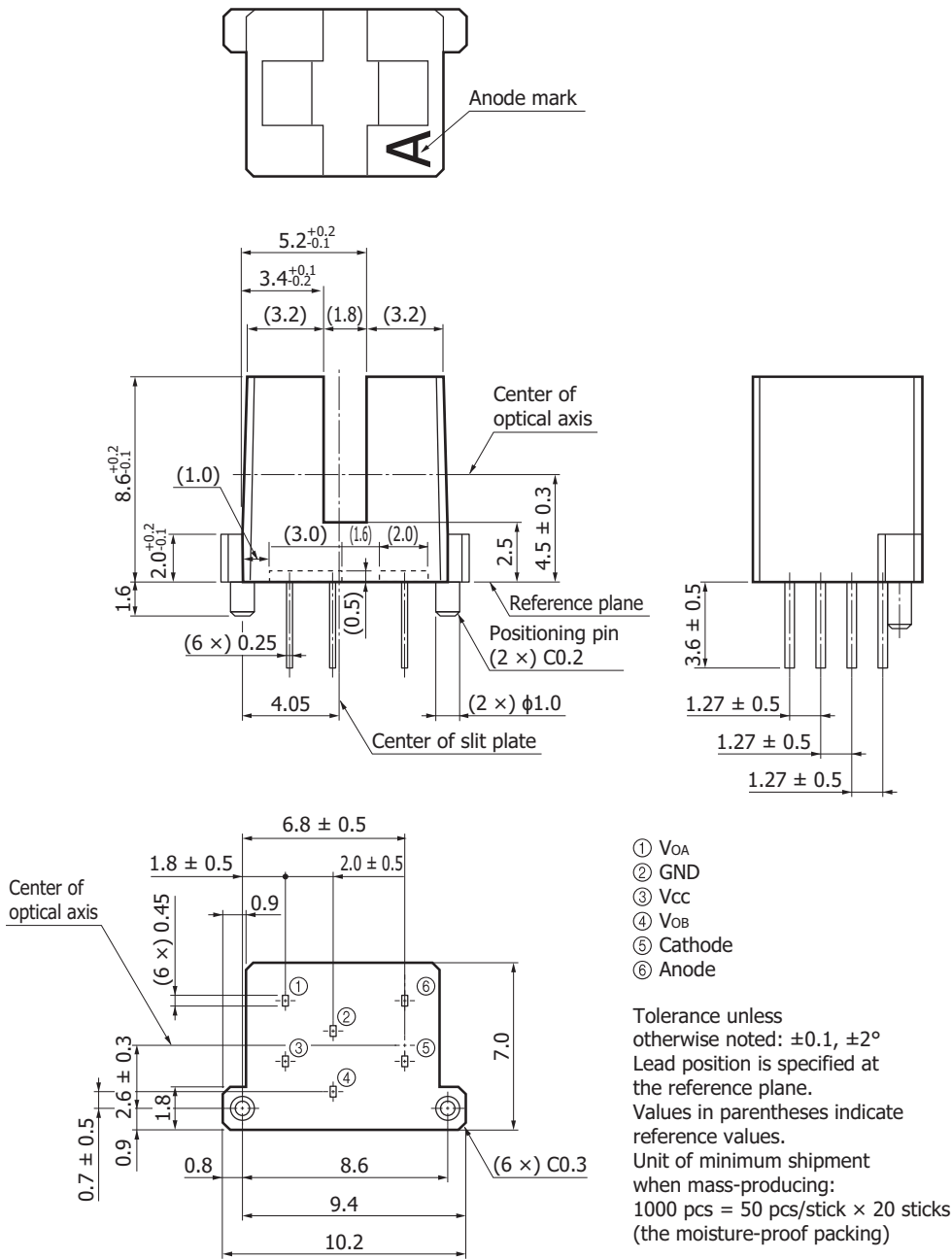
Note: Connect a capacitor of 0.1 µF or more between Vcc and GND terminal.

## Block diagram



KPC0011EB

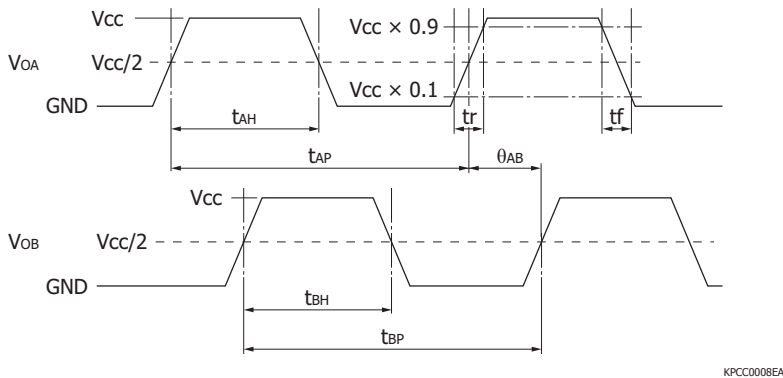
### Dimensional outline (unit: mm)



KPCA0010EB

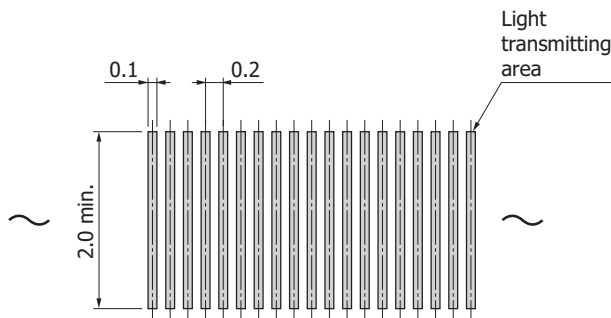
## Operation timing diagram

Measured when the slits move at a constant speed towards you from the inner side as viewed from the front, in the middle left drawing in "Dimensional outline".



## Recommended slit dimension (unit: mm, t=0.1)

(For recommended position, see "Dimensional outline.")



Information described in this material is current as of July, 2014.

Product specifications are subject to change without prior notice due to improvements or other reasons. This document has been carefully prepared and the information contained is believed to be accurate. In rare cases, however, there may be inaccuracies such as text errors. Before using these products, always contact us for the delivery specification sheet to check the latest specifications.

The product warranty is valid for one year after delivery and is limited to product repair or replacement for defects discovered and reported to us within that one year period. However, even if within the warranty period we accept absolutely no liability for any loss caused by natural disasters or improper product use.

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