Encoder module
P10210

Small package and high resolution encoder module

P10210 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, P10210 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

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	-25 to +75	°C
Storage temperature		Tstg	-30 to +85	°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: P10210 is not suitable for reflow soldering and flow soldering. Always use a soldering iron to solder this module.

■ 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 *3	Icc		-	6.0	10	mA
Transfer characteristics	Duty ratio *4	tAH/tAP	IF=5 mA, f=10 kHz	35	50	65	%
		tBH/tBP		35	50	65	%
	Phase difference *4	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 *4, *5	f Max	IF=5 mA	50	-	-	kHz

*3: Supply current 1 is a typical value when VOA and VOB outputs indicate H : L=1 : 1.
Supply current 2 is a value when both VOA and VOB outputs are "L".
*4: Measured when recommended slits are used in specified position.
Response frequency f is the reciprocal of the time required to move one pitch.
*5: 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.

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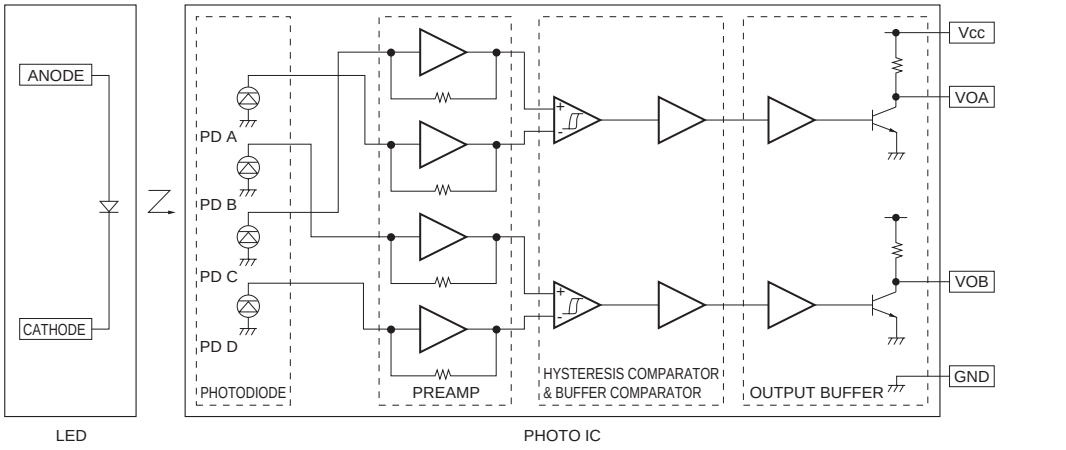
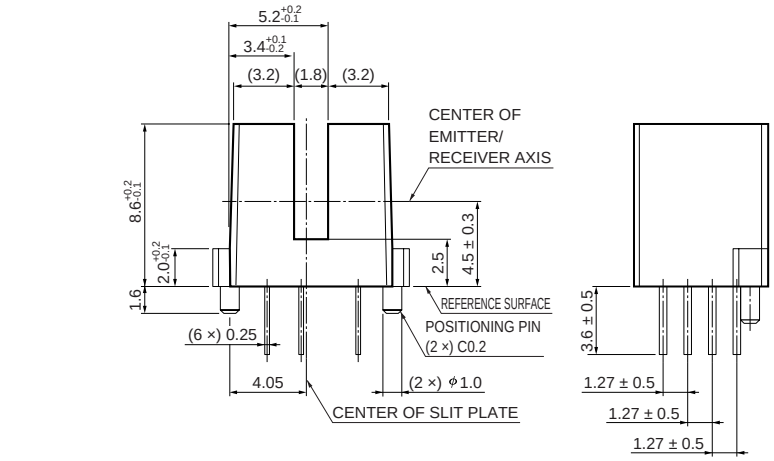
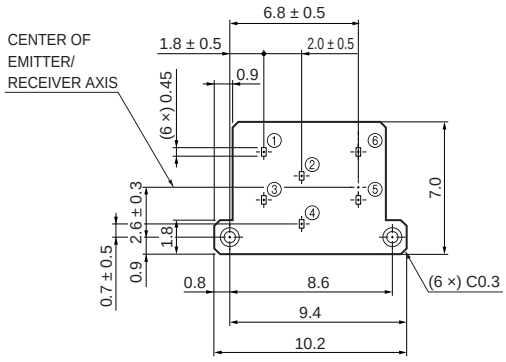
■ Block diagram



■ Dimensional outline (unit: mm)





① VOA
② GND
③ Vcc
④ VOB
⑤ CATHODE (LED)
⑥ ANODE (LED)

Tolerance unless otherwise noted: ±0.1, ±2°
Lead pitch is specified at the reference surface.
Values in parenthese indicate reference value.

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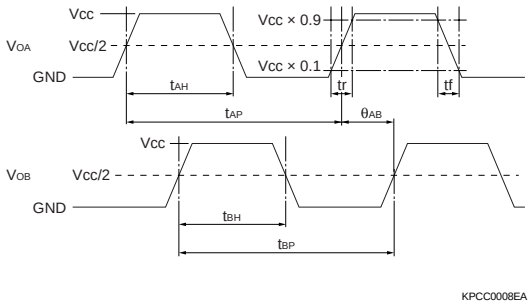
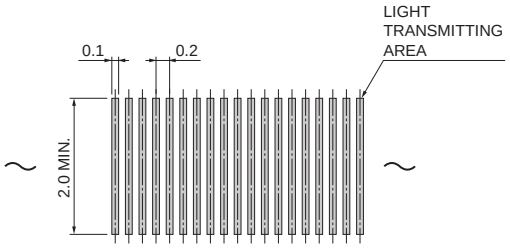
■ Operation timing diagram

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



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

(For recommended position, see “Dimensional outline”.)



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