

C4674-01

Circuit board for easier 2-D PSD operation

The C4674-01 is a DC signal processing circuit for two-dimensional PSD. It is suitable for displacement measurements using DC light.

Features

- **No complicated adjustments required**
Position measurement of a light spot can be made simply by mounting 2-D PSD.
- **Output voltage directly representing the position data**
The position (mm) of a light spot from the PSD center is obtained as an output voltage (V).
- **Accurate position sensing**
Position data of light spot is independent of incident light intensity.
- **Three sensitivity ranges**
- **Compact design**
Head amp, signal addition/subtraction circuits, and analog divider circuit are mounted on a compact PC board.

Applications

- **Displacement measurements using DC light**
- **Various studies using 2-D PSD**
- **Performance evaluation of 2-D PSD**

Absolute maximum ratings (Ta=25 °C unless otherwise noted)

Parameter	Symbol	Value	Unit
Supply voltage	Vcc max	±18	V
Operating temperature*1	Topr	0 to +50	°C
Storage temperature*1	Tstg	-10 to +60	°C
Input voltage	VIN max	Vcc max	V
Output short-circuit time	-	Continuous	s

*1: No dew condensation

When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

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.

Specifications (Ta=25 °C, Vcc=±15 V)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	
Head amp conversion impedance		Rf	*2	H range	-	1 × 10 ⁶	-	
			M range	-	1 × 10 ⁵	-		
			L range	-	1 × 10 ⁴	-		
Head amp feedback capacitance		Cf	*2	H range	-	10	-	
			M range	-	100	-		
			L range	-	1000	-		
Input signal current		I _{IN}	*3	H range	1 × 10 ⁻⁶	-	1 × 10 ⁻⁵	
			M range	1 × 10 ⁻⁵	-	1 × 10 ⁻⁴		
			L range	1 × 10 ⁻⁴	-	1 × 10 ⁻³		
Head amp differential output (V1, V2)	Rise time		Tr	*4	-	22	30	μs
	Output voltage	High	VOH		+13.5	+13.8	-	V
		Low	VOL		-	-13.8	-13.5	
	Output noise voltage		Vn	*5	-	2	-	mVp-p
Output offset voltage		Vos	*5	-5	-	+5	mV	
Sum signal output (V3)	Rise time		Tr	*4	-	22	30	μs
	Output voltage	High	VOH		+13.5	+13.8	-	V
		Low	VOL		-	0	-	
	Output noise voltage		Vn	*5	-	2	-	mVp-p
Output offset voltage		Vos	*5	-5	-	+5	mV	
Position signal output (V4, V5)	Rise time		Tr	*4	-	22	30	μs
	Maximum output amplitude voltage		Vo	Factory setup prior to shipping*6	±6.8	±7	±7.2	V
	Output noise voltage		Vn	*5	-	5	-	mVp-p
	Output offset voltage		Vos	*5	-70	-	+70	mV
PSD reverse bias voltage		VR	Factory setup prior to shipping*7	+4.9	+5	+5.1	V	
Supply voltage		Vcc	*8	±14.5	±15	±15.5	V	
Current consumption		Icc	*5	-	±15	-	mA	

*2: Factory setup prior to shipping is M range. The range can be switched with the jumper on the board.

*3: Photocurrent I_{sc} with PSD installed (total input signal). PSD does not operate correctly if the input signal current is outside the specified range.

*4: Output response time 10 to 90%

*5: With no PSD installed. Current signal that substitutes for PSD photocurrent (L range: X1=X2=Y1=Y2=200 μA, M range: X1=X2=Y1=Y2=20 μA, H range: X1=X2=Y1=Y2=2 μA) is input. When maximum output amplitude voltage Vo=±7 V is set.

*6: Factory setup prior to shipping is ±7 V. Maximum output amplitude can be adjusted in a range of ±2 to ±10 V with a variable resistor on the board according to the PSD type to be used.

*7: Factory setup prior to shipping is +5 V. The voltage can be adjusted in the range of 0 to +14 V with a variable resistor on the board.

*8: Switching power supplies are not supported. Use a series power supply (with 3 mVp-p or less ripple voltage).

Combination with a PSD

A PSD is installed (soldered) on the signal processing circuit.

Note: PSDs are sold separately.

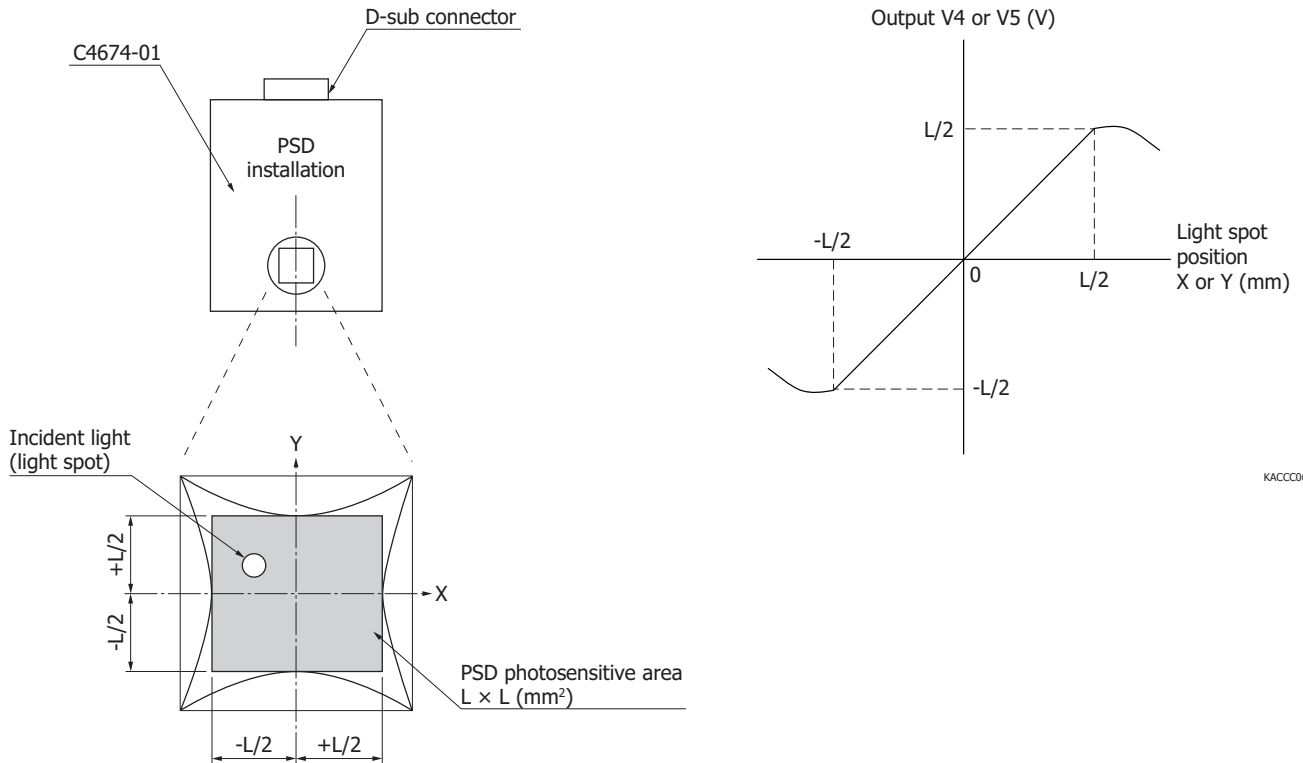
Type no.	Photosensitive area size (mm)	Position resolution*9 (μm)	Package (mm)	Installation on board	Using dedicated board	External*10 attachment
S1880	12 × 12	5	Ceramic (φ28)	○	×	○
S2044	4.7 × 4.7	2	Metal (TO-8 φ14)	○	×	○
S5990-01	4 × 4	1.7	Ceramic chip carrier (8.8 × 10.6)	×	○	○
S5991-01	9 × 9	3.8	Ceramic chip carrier (14.5 × 16.5)	×	○	○

*9: Reference value. When maximum output amplitude voltage Vo=±7 V is set.

*10: Wiring using shielded wires or AWG#26 or equivalent twisted pair wires (no longer than 30 cm) is recommended.

PSD and output voltage

With the D-sub connector on top, the output corresponding to the horizontal position (converted output voltage of the X position) is output from D-sub connector terminal No. 1 (V5), and the output corresponding to the vertical position (converted output voltage of the Y position) is output from D-sub connector terminal No. 2 (V4).

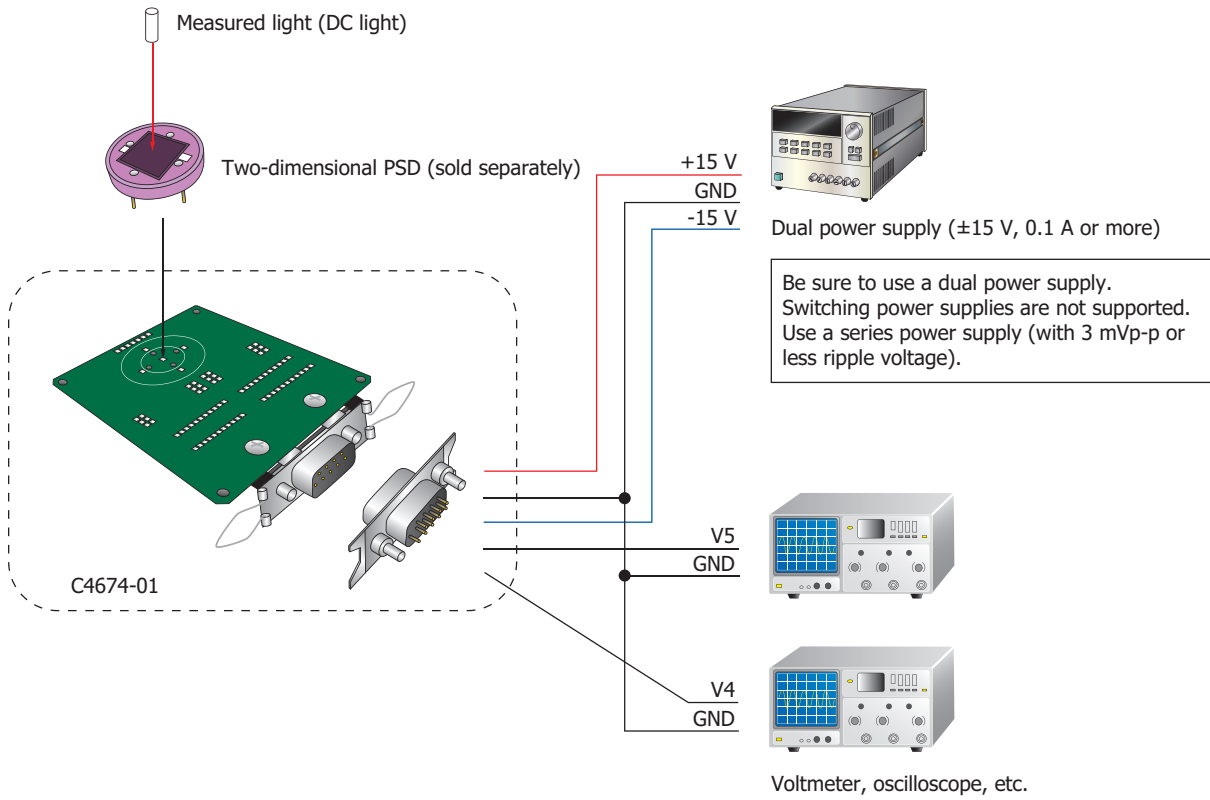


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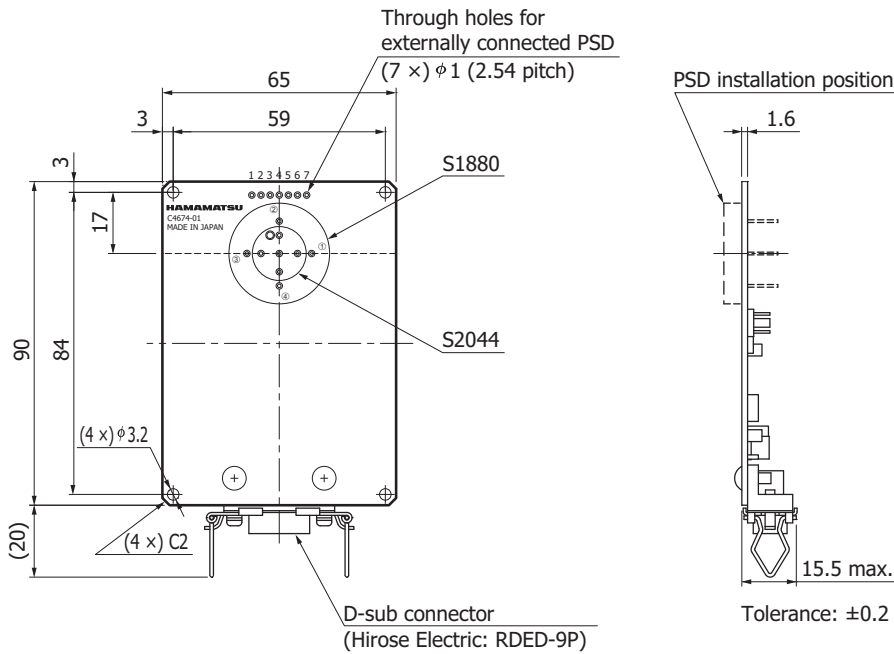
Parameter	Symbol	Two-dimensional PSD				Unit
		S1880	S2044	S5990-01	S5991-01	
Photosensitive area length	L	12	4.7	4	9	mm
Output voltage amplitude	V4 (X)	±6	±2.35	±2	±4.5	V
	V5 (Y)	±6	±2.35	±2	±4.5	V

Connection example



KACCC0652EB

Dimensional outline (unit: mm)



KACCA0304EA

Pin connections

■ D-sub connector

Pin no.	Name	Content
1	V5	X position signal output
2	V4	Y position signal output
3	+V	+15 V
4	-V	-15 V
5	G	GND
6	V3	Sum signal output (incident light level monitor output)
7	V2	X position head amp differential output
8	V _R	PSD reverse bias voltage monitor output
9	V1	Y position head amp differential output

■ Through holes for externally connected PSD

Pin no.	Name	Content
1	G	GND (for signal cable shield)
2	Y2	Connection to PSD anode terminal "Y2"
3	X2	Connection to PSD anode terminal "X2"
4	V _R	PSD reverse bias voltage output: connection to PSD cathode terminal
5	Y1	Connection to PSD anode terminal "Y1"
6	X1	Connection to PSD anode terminal "X1"
7	G	GND (for signal cable shield)

Accessories

- Instruction manual
- Connector HDEB-9S (Hirose Electric: for connections to power supply and output readout device)
- S5990-01/S5991-01 mounting board

Related information

www.hamamatsu.com/sp/ssd/doc_en.html

■ Precautions

- Disclaimer

Information described in this material is current as of December 2016.

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