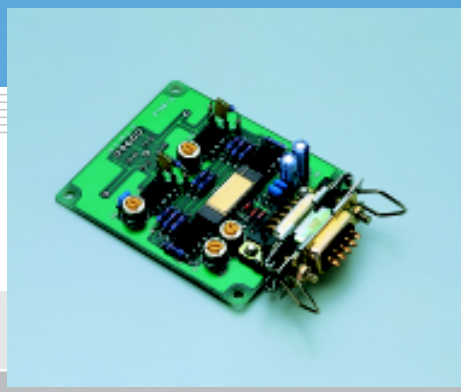


Signal processing circuit for 1-D PSD

C3683-01

Circuit board for easier 1-D PSD operation



Features

- No complicated adjustments required
Position can be measured just by installing a 1-D PSD on the board.
- Accurate position sensing
Position data of light spot is independent of light intensity.
- 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 1-D PSD
- Performance evaluation of 1-D PSD

■ Absolute maximum ratings

Parameter	Symbol	Value	Unit
Supply voltage	V _{SM}	±18	V
Input signal current	I _{IN}	V _{SM} × 10 ⁻⁵	A
Output short-circuit time	-	Continuous	s
Operating temperature	T _{opr}	0 to +50	°C

■ Recommended operating range

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	V _s		±14.5	±15	±15.5	V

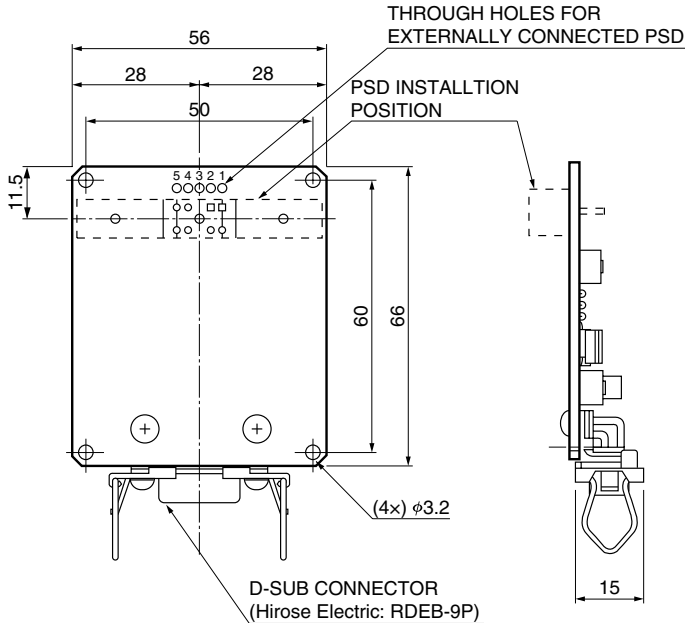
■ Specifications / Characteristics (T_a=25 °C, V_s=±15 V)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Head amp conversion impedance	R _f	Factory setup prior to shipping	0.95 × 10 ⁵	1 × 10 ⁵	1.05 × 10 ⁵	V/A
Feedback capacitance	C _f	Factory setup prior to shipping	950	1000	1050	pF
Input signal current *1	I _{IN}	Photocurrent with PSD installed	1 × 10 ⁻⁵	-	1 × 10 ⁻⁴	A
Rise time (output 10 to 90 %)	t _r	Output response time versus movement of light spot position, measured with PSD installed.	300	-	-	μs
PSD reverse voltage	V _R	Factory setup prior to shipping	0	5	14	V
Output offset voltage	V _{OS}	*2	-10	-	+10	mV
Output voltage amplitude	V _{FS}	With PSD installed and light spot falling on edge of active area.	-	-	±10	V
Output noise (analog divider)	V _{no}	All range *2	-	25	-	mVp-p
Current consumption	I _s	*2	-	15	-	mA

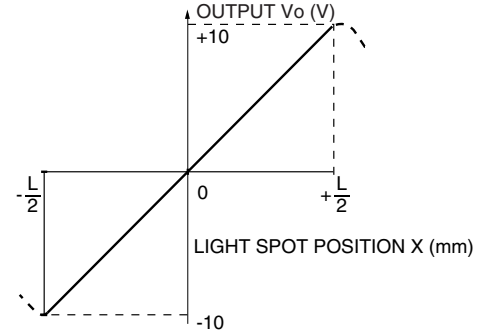
*1: PSD does not operate correctly if the input signal current is outside the specified range.

*2: With no PSD installed, 20 μA (X1=Y1) is supplied to the circuit as current signal that substitutes for PSD photocurrent

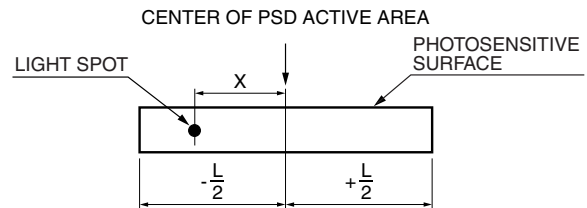
■ Dimensional outline (unit: mm, tolerance: ± 0.2 mm)



■ PSD and output voltage



KACCC0040EA

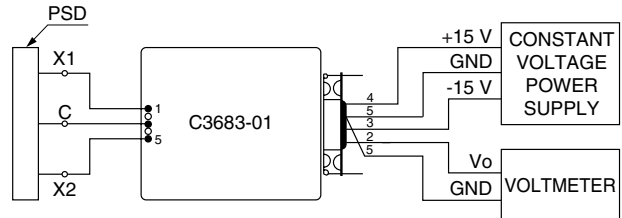


KACCA0035EB

KPSCD0062EA

S1352, S3931 and S3932 (PSD made by Hamamatsu) can be directly mounted on the board. To mount other types of 1-D PSDs, use through holes on the board.

■ Operating example



KACCC0039EA

■ Input/output terminals

● D-sub connector

Terminal No.	Name	Content
1	VR	PSD bias voltage monitor output
2	V _o	Divider output (position-converted voltage)
3	-V	-15 V input
4	+V	+15 V input
5	G	GND
6	V _B	Subtracted signal output
7	V ₁	Head amp output 1
8	V ₂	Head amp output 2
9	V _A	Summed signal output

● Through holes for externally connected PSD

Terminal No.	Name	Content
1	IN ₁	Input from PSD output 1
2	G	GND
3	VR	Bias voltage output for connection to PSD cathode
4	G	GND
5	IN ₂	Input from PSD output 2

Measurement conditions

1. Light source: LED ($\lambda_p=900$ nm)
2. Light spot: $\phi 200$ μ m
3. PSD: S1352 ($L=34$ mm)
4. PSD photocurrent: 10 μ A
5. Voltmeter: 195A (KEITHLEY)
6. Frequency bandwidth: 10 Hz
7. Constant voltage power supply: ± 15 V, power supply capacity: 0.3 A or more, ripple voltage: 3 mVp-p or less

When measured under the above conditions, the following output voltage amplitude and position resolution can be obtained.

- Output voltage amplitude: $V_{FS}=\pm 10$ V
- Position resolution: $\Delta l \approx$ approx. 0.3 μ m (calculated value)

■ Accessories

- Connector HDEB-9S (Hirose Electric: For connections to power supply and output readout device)

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