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

- Autoriate maximum ratings				
Parameter	Symbol	Value	Unit	
Supply voltage	Vcc Max.	±18	V	
Input signal current	IIN Max.	Vcc Max. × 10⁻⁵	Α	
Output short-circuit time	-	Continuous	S	
Operating temperature	Topr	0 to +50	°C	

■ Recommended operating range

Parameter	Symbol	Condition	Min.	Тур.	Max.	Unit
Supply voltage	Vcc		±14.5	±15	±15.5	V

■ Specifications / Characteristics (Ta=25 °C, Vcc=±15 V)

Parameter	Symbol	Condition	Min.	Тур.	Max.	Unit
Head amp conversion impedance *1	Rf	Factory setup prior to shipping	0.95 × 10 ⁵	1 × 10⁵	1.05 × 10 ⁵	V/A
Feedback capacitance	Cf	Factory setup prior to shipping	950	1000	1050	pF
Input signal current *2	lin	Photocurrent with PSD installed	1 × 10 ⁻⁵	-	1 × 10 ⁻⁴	Α
Rise time (output 10 to 90 %)	tr	Output response time versus movement of light spot position, measured with PSD installed.	300	-	-	μs
PSD reverse voltage	VR	Factory setup prior to shipping	0	+5	+14	V
Output offset voltage	Vos	*3	-10	-	+10	mV
Output voltage amplitude	Vo	With PSD installed and light spot falling on edge of active area.	-10	-	+10	V
Output noise (analog divider)	Vn	All range *3	-	25	-	mVp-p
Current consumption	Icc	*3	-	±15	-	mA

^{*1:} These resistors are lead types and inserted into sockets, so it can be easily to exchange by the user if necessary in a range between 1×10^4 to 1×10^6 Ω .

For more details, see the instruction manual that comes with the product.

^{*3:} With no PSD installed, 20 μA (X1=X2) is supplied to the circuit as current signal that substitutes for PSD photocurrent

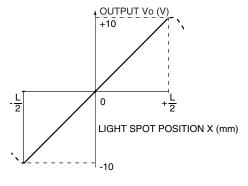


^{*2:} PSD does not operate correctly if the input signal current is outside the specified range.

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

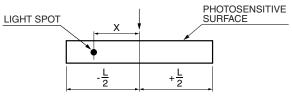
THROUGH HOLES FOR EXTERNALLY CONNECTED PSD 56 28 28 PSD INSTALLTION 50 **POSITION** 9 99 (+)(+)(4×) φ3.2 **D-SUB CONNECTOR** 15.5 MAX. (Hirose Electric: RDEB-9P)

■ PSD and output voltage



KACCC0040EA

CENTER OF PSD ACTIVE AREA



KACCA0035EC KPSDC0062EA

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.

■ Input/output terminals

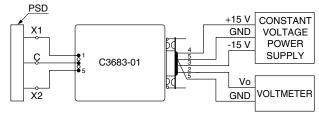
D-sub connector

- B-3db connector					
Terminal No.	Name	Content			
1	VR	PSD bias voltage monitor output			
2	Vo	Divider output			
		(position-converted voltage)			
3	-V	-15 V input			
4	+V	+15 V input			
5	G	GND			
6	Vв	Subtracted signal output			
7	V2	Head amp output 2			
8	V1	Head amp output 1			
9	VA	Summed signal output			

Through holes for externally connected PSD

Terminal No.	Name	me 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	

■ Operating example



KACCC0039EA

Measurement conditions

- 1. Light source: LED (λp=900 nm)
- 2. Light spot: φ200 μm
- 3. PSD: S1352 (L=34 mm)
- 4. PSD photocurrent: 10 µA
- 5. Voltmeter: 195A (KEITHLEY)
- 6. Frequency bandwidth: 10 Hz
- 7. Constant voltage power supply: ±15 V, power supply capacity:
- 0.1 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: VFS=±10 V
- · Position resolution: Δl =approx. 0.3 µm (calculated value)

Accessories

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

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