

# 16 × 16 element photodiode array detector C4675 series

2-D detector using 256-element photodiode with visible sensitivity



C4675 series is a two-dimensional detector using a 16 × 16 (256) element Si PIN photodiode array that has high sensitivity in the visible range. Current-to-voltage conversion amplifiers in the signal amplifier section are connected in parallel to each element of the photodiode array, thereby allowing high-speed parallel signal processing.

C4675 series is also designed to suppress the power consumption so it operates from two power supplies ( $\pm 15$  V).

## Features

- Wide spectral response: 400 to 1000 nm
- Wide active area: 17.45 × 17.45 mm (0.95 × 0.95 mm per element, 1.1 mm pitch)
- Frequency response  
C4675-102: DC to 1 kHz  
C4675-302: DC to 3 kHz  
C4675-103: DC to 10 kHz
- Parallel signal output by current-to-voltage amplifier
- Low power consumption: 2.5 W Typ.

## Applications

- Nerve potential measurement under microscope
- 2-D (wavelength × spatial position) spectrophotometry in visible range
- Fine-modulation light measurement

## General ratings

Parameter	Rating	Unit
Photodiode	Si PIN photodiode array (Made by Hamamatsu S4529)	-
Number of element	16 × 16 (256)	-
Active area (per 1 element)	0.95 × 0.95	mm
Element pitch	1.1	mm
Output type	Current-to-voltage conversion method, 256-ch parallel analog voltage output	-
Dimensional outline	136 (W) × 136 (H) × 153.5 (D)	mm
Weight	2.1	kg

## Absolute maximum ratings

Parameter	Symbol	Value	Unit
Operating temperature	Topr	0 to +50	°C
Storage temperature	Tstg	-10 to +60 (no condensation)	°C
Supply voltage	Vs	$\pm 18$	V

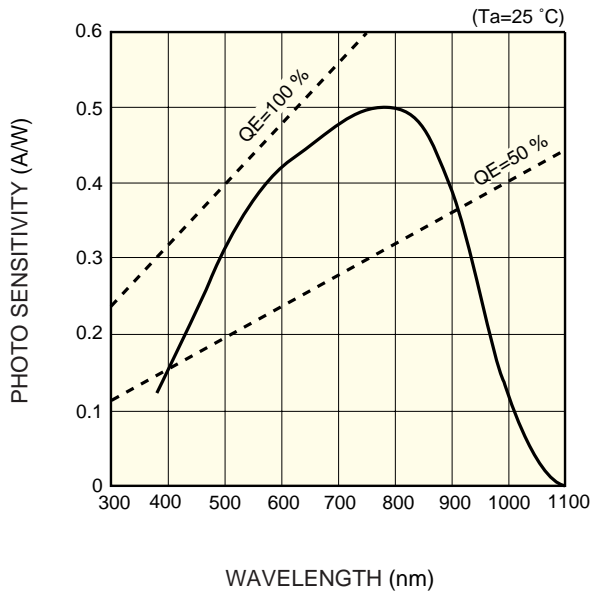
## Electrical and optical characteristics (Typ. Ta=25 °C)

Parameter	Symbol	C4675-102	C4675-302	C4675-103	Unit
Spectral response range	$\lambda$	400 to 1000			nm
Output uniformity	-	$\pm 15$			%
Amp gain	-	$10^8$	$5 \times 10^7$	$10^7$	V/A
Frequency response	-	DC to 1 k	DC to 3 k	DC to 10 k	Hz
Supply voltage	Vs	$\pm 15$			V
Current consumption	P	2.5			W

## Construct device

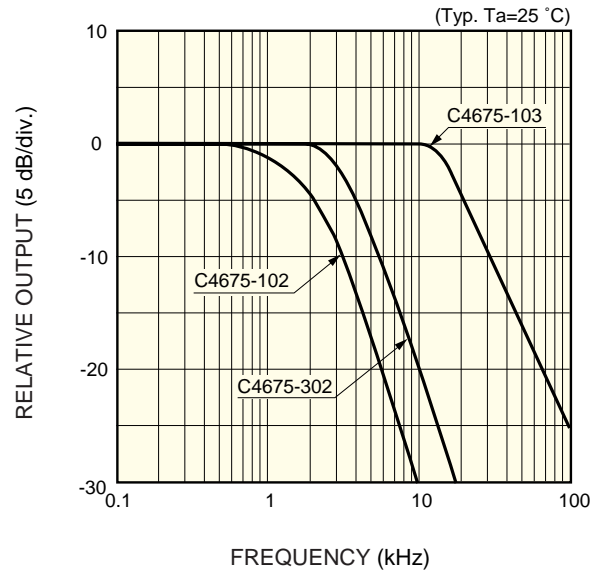
Product name	Type No.	Number	Note
Two-dimensional detector	C4675 series	1	
Dedicated cable	8840S-080-174AD-150-W	4	Made by KEL, length 1.5 m
Output connector	8850-080-170SD	4	Made by KEL, on-board straight installation type

■ Spectral response



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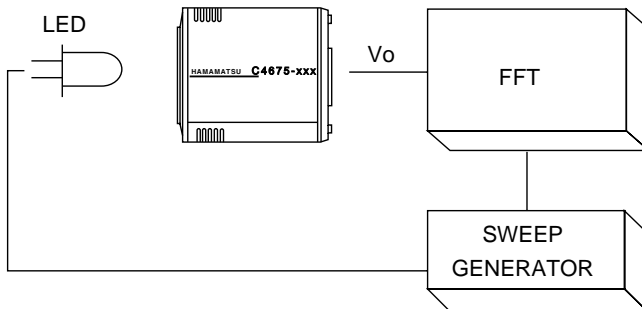
■ Frequency response



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■ Measurement method for frequency characteristics

The LED output was adjusted so that the output voltage  $V_o$  from C4675 series is set to 5 V. Under this condition, the output of C4675 series was monitored by FFT while sweeping the LED drive frequencies.



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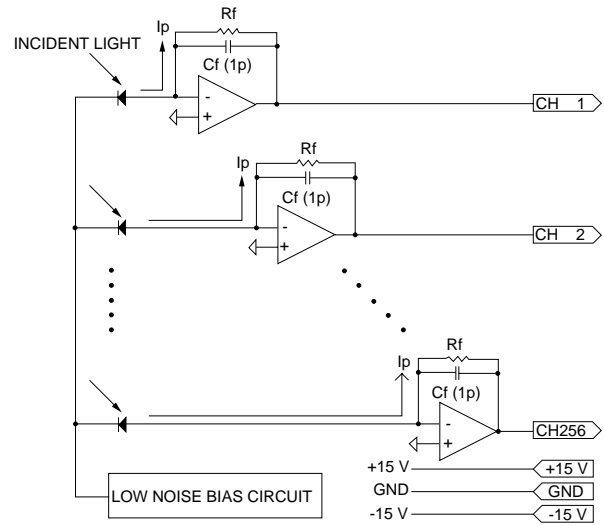
■ Operating principle

When light enters a photodiode, photoelectric conversion occurs in the photodiode and the photocurrent  $I_p$  is generated. The photocurrent  $I_p$  then flows through the current-to-voltage conversion amplifier feedback resistance  $R_f$  and is output as voltage  $V (=I_p \times R_f)$ .

C4675 series uses current-to-voltage conversion amplifiers connected to each of the 256-element photodiodes to perform parallel signal processing. A low noise bias circuit is also used to reduce the photodiode junction capacitance.

Type No.	Feedback resistance	Feedback capacitance
C4675-102	100 MΩ	1 pF
C4675-302	50 MΩ	
C4675-103	10 MΩ	

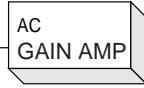
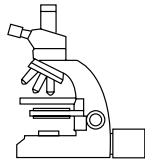
■ Block diagram



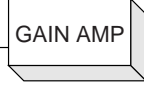
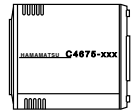
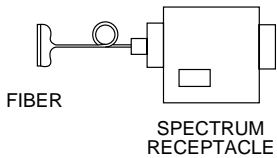
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■ Application example

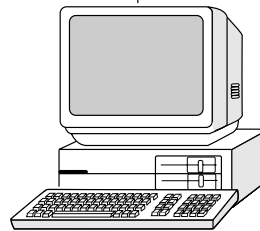
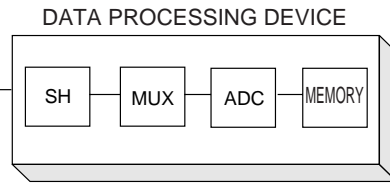
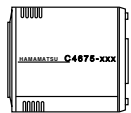
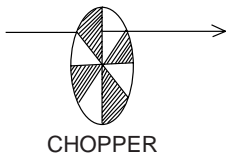
- Nerve potential measurement under microscope



- 2-D spectrophotometry in visible range



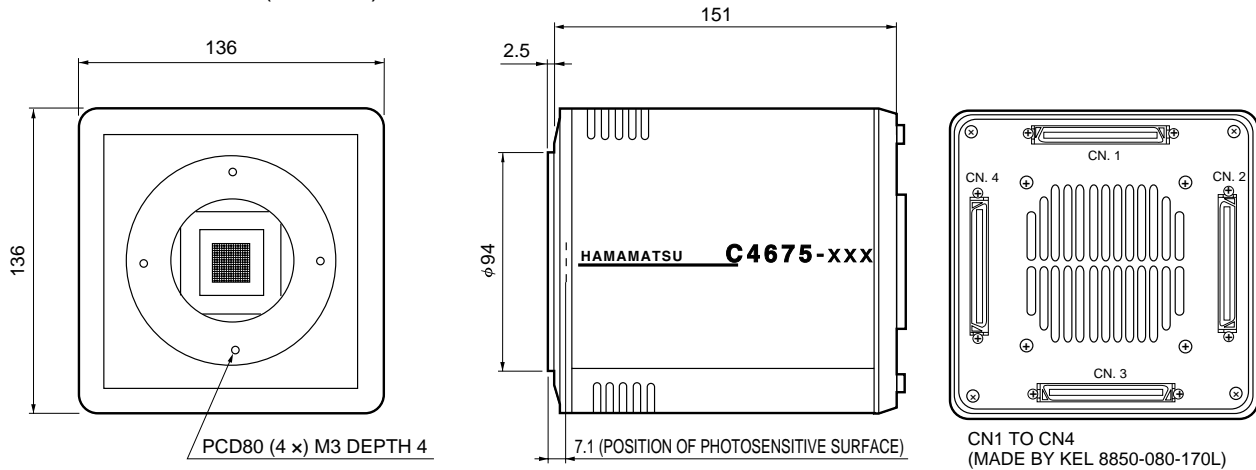
- Fine-modulation light measurement



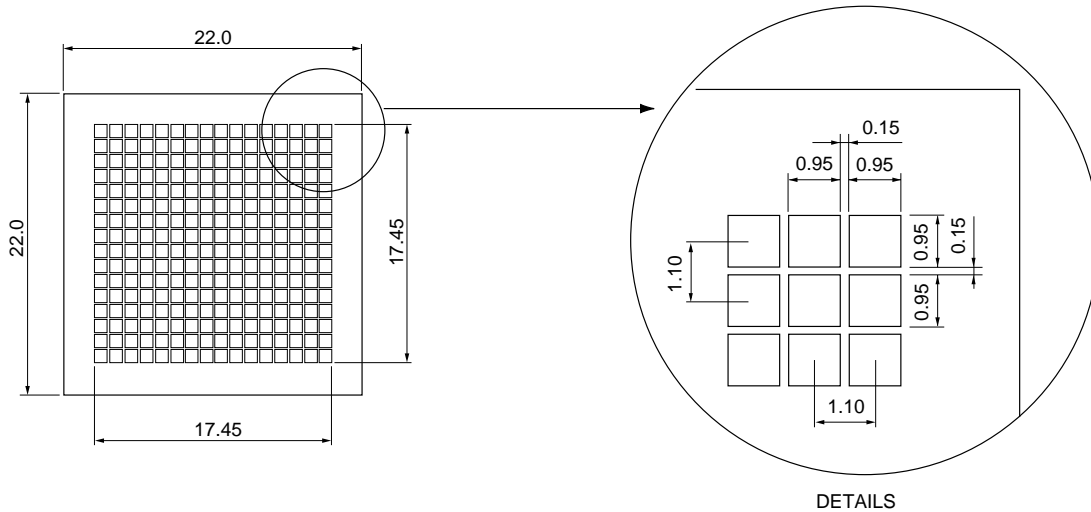
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# 16 × 16 element photodiode array detector C4675 series

## Dimensional outline (unit: mm)



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DETAILS OF ACTIVE AREA (16 × 16 element photodiode array S4529)

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