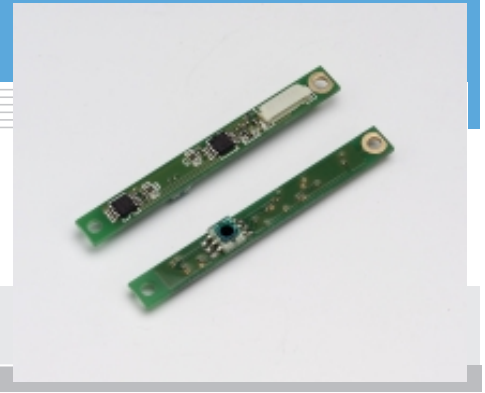


# Color sensor module

## C9303-04

RGB-LED backlight monitor for TFT-LCD (Liquid Crystal Display)



Recently, RGB-LEDs have been in the focus of attention as the backlight for TFT-LCD (liquid crystal display) since LEDs are mercury-free unlike conventional cold cathode fluorescent lamps. Hamamatsu C9303-04 color sensor module has been specifically developed for the power monitor of RGB-LEDs. We welcome requests for custom shapes and RGB gain. Feel free to contact our sales office.

### Features

- Built-in RGB color sensor  
Sensitivity matches wavelengths of RGB-LED backlight for TFT-LCD.
- 3 ch current-to-voltage amplifiers  
Simultaneous output of 3 ch RGB photocurrent
- Configuration and size suitable for side mounting to TFT-LCD
- Suitable for lead-free solder
- Pin compatible with previous device
- Low current consumption

### Applications

- RGB-LED backlight monitor for TFT-LCD

#### ■ Absolute maximum ratings (Ta=25 °C)

| Parameter                | Symbol | Value      | Unit |
|--------------------------|--------|------------|------|
| Supply voltage           | Vcc    | +5.5       | V    |
| Reference voltage        | VREF   | Vcc - 0.4  | V    |
| Operating temperature *1 | Topr   | -20 to +85 | °C   |
| Storage temperature *1   | Tstg   | -20 to +85 | °C   |

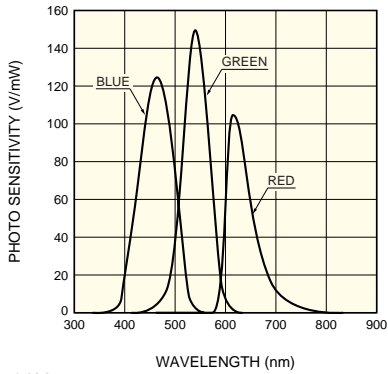
\*1: No condensation

#### ■ Electrical and optical characteristics (Ta=25 °C, Vcc=5.0 V, VREF=3.000 V, unless otherwise noted: 1 ch)

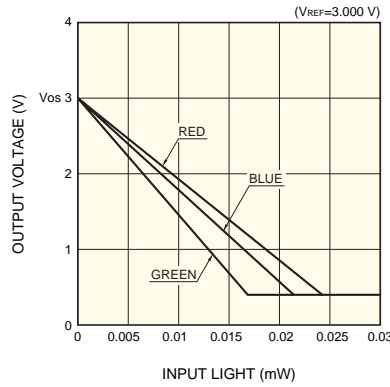
| Parameter                      | Symbol      | Condition                              | Min.     | Typ.       | Max.   | Unit       |
|--------------------------------|-------------|--|----------|------------|--------|------------|
| Spectral response range        | $\lambda$   | Red                                    | -        | 590 to 720 | -      | nm         |
|                                |             | Green                                  | -        | 480 to 600 | -      |            |
|                                |             | Blue                                   | -        | 400 to 540 | -      |            |
| Peak sensitivity wavelength    | $\lambda_p$ | Red                                    | -        | 620        | -      | nm         |
|                                |             | Green                                  | -        | 540        | -      |            |
|                                |             | Blue                                   | -        | 460        | -      |            |
| Photo sensitivity              | SR          | $\lambda_p=620$ nm                     | -74      | -108       | -      | V/mW       |
|                                | SG          | $\lambda_p=540$ nm                     | -122     | -156       | -      |            |
|                                | SB          | $\lambda_p=460$ nm                     | -88      | -122       | -      |            |
| Trans-impedance                | ZtR         | Red                                    | -        | 680        | -      | k $\Omega$ |
|                                | ZtG         | Green                                  | -        | 680        | -      |            |
|                                | ZtB         | Blue                                   | -        | 680        | -      |            |
| Output offset voltage          | Vos         | Dark state                             | VREF-5   | -          | VREF+5 | mV         |
| Output voltage range           | Vout        |  | 0.4      | -          | Vos    | V          |
| Output signal polarity *2      | Vout        |  | Negative |            |        | -          |
| Output noise voltage swing     | Vn          | Dark state, within frequency bandwidth | -        | 5          | -      | mVp-p      |
| Rise time                      | tr          | 10 to 90 %                             | -        | 150        | -      | $\mu$ s    |
| Cut-off frequency              | fc          | -3 dB                                  | -        | 2.4        | -      | kHz        |
| Current consumption            | Icc         | Dark state                             | -        | 0.4        | 1.5    | mA         |
| Operating supply voltage range | Vcc         |  | +2.7     | +5         | +5.5   | V          |

\*2: See next page graph (■ Output voltage vs. input light).

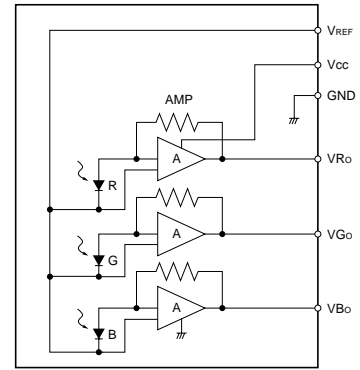
■ Spectral response



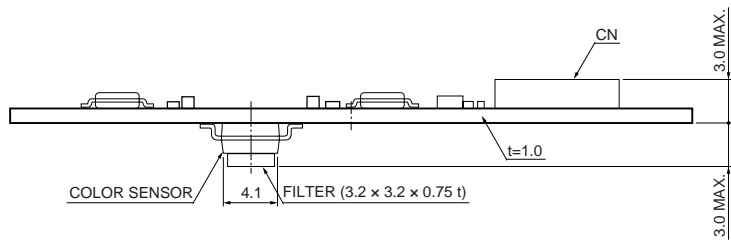
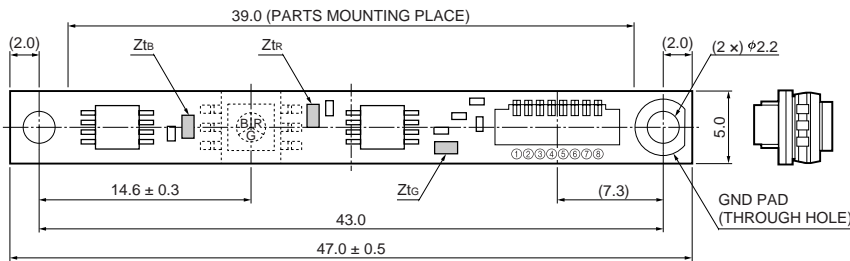
■ Output voltage vs. input light



■ Block diagram



■ Dimensional outline (unit: mm)



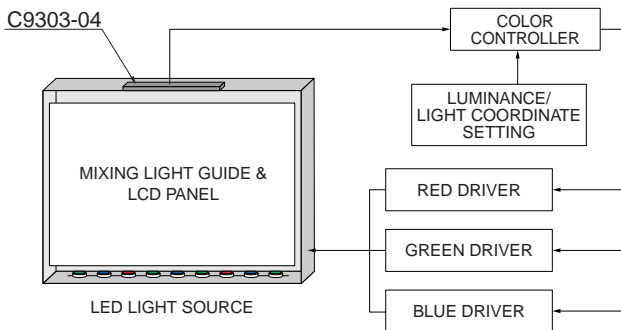
| Pin No. | Signal |
|---------|--------|
| ①       | VREF   |
| ②       | Vcc    |
| ③       | GND    |
| ④       | NC     |
| ⑤       | VGo    |
| ⑥       | VRo    |
| ⑦       | VBo    |
| ⑧       | NC     |

Connector: CN SM08B-SURS-TF (JST)  
Mating cable: AWG#32  
Tolerance unless otherwise noted: ±0.2

KACCA0160EA

■ Application example

Optical feedback of backlight for TFT-LCD



LED: Made by Lumileds (LUXEON), <http://www.lumileds.com/>

KACCC0289EA

■ Accessory

Dedicated cable with connector

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