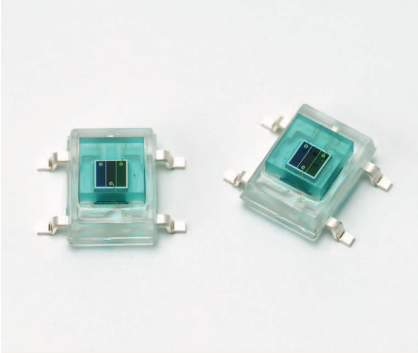
HAMAMATSU
PHOTON IS OUR BUSINESS

Si photodiode

S9702



RGB color sensor

The S9702 is a color sensor molded into a plastic package having a 3-channel (RGB) photodiode sensitive to the blue (λp=460 nm), green (λp=540 nm) and red (λp=620 nm) regions of the spectrum. The S9702 has a 3-segment (RGB) photosensitive area of □1 mm. When compared to the previous model (S9032-02), the S9702 is significantly miniaturized (package size 55% less in cubic volume, PC board mount space 43% less in area).

Features

- **3-channel (RGB) Si photodiode**
- **Surface-mount small plastic package**
- **Spectral response range close to the human eye sensitivity**
- **No sensitivity in the near IR region**
- **Photosensitive area: 3-segment (RGB) photosensitive area of □1 mm**

Applications

- **Portable or mobile equipment**
- **RGB-LCD backlight monitors**
- **Detectors for various light sources**
- **Color detection**

Absolute maximum ratings

Parameter	Symbol	Value	Unit
Reverse voltage	V_R max	10	V
Operating temperature	Topr	-25 to +85	°C
Storage temperature	Tstg	-40 to +85	°C

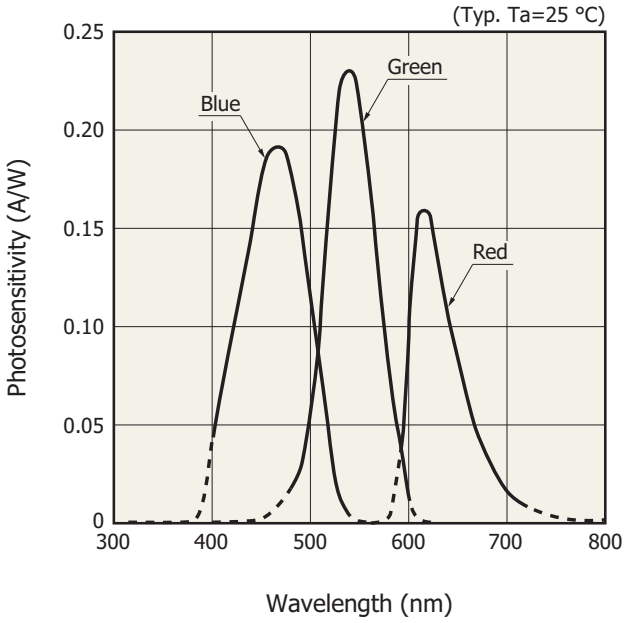
Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

Electrical and optical characteristics (Ta= 25 °C, per element)

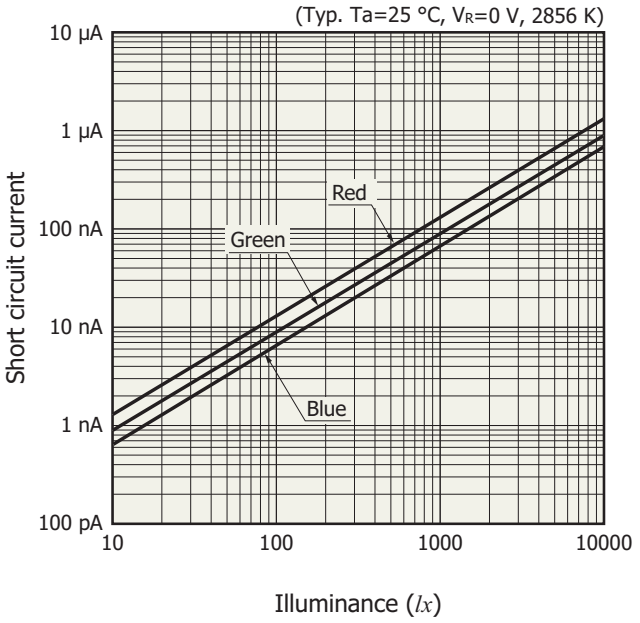
Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
Spectral response range	λ	Blue		-	400 to 540	-	nm
		Green		-	480 to 600	-	
		Red		-	590 to 720	-	
Peak sensitivity wavelength	λp	Blue		-	460	-	nm
		Green		-	540	-	
		Red		-	620	-	
Photosensitivity	S	λ=λp	Blue	0.13	0.18	-	A/W
			Green	0.18	0.23	-	
			Red	0.11	0.16	-	
Dark current	I_D	V_R=1 V All elements		-	1	50	pA
Temperature coefficient of I_D	T_{CID}			-	1.12	-	times/°C
Rise time	tr	V_R=0 V, R_L=1 kΩ 10 to 90%		-	0.1	1.0	μs
Terminal capacitance	Ct	V_R=0 V, f=10 kHz		-	12	25	pF

This product does not support lead-free soldering. For details on reflow soldering conditions, please contact our sales office.

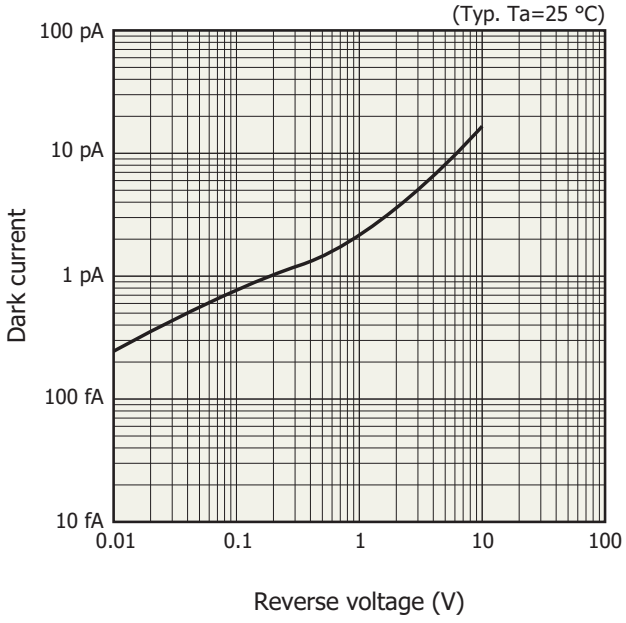
Spectral response



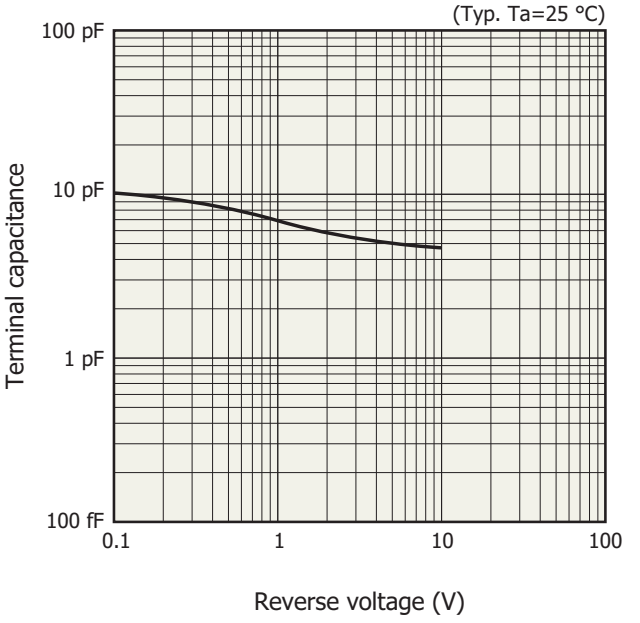
Linearity



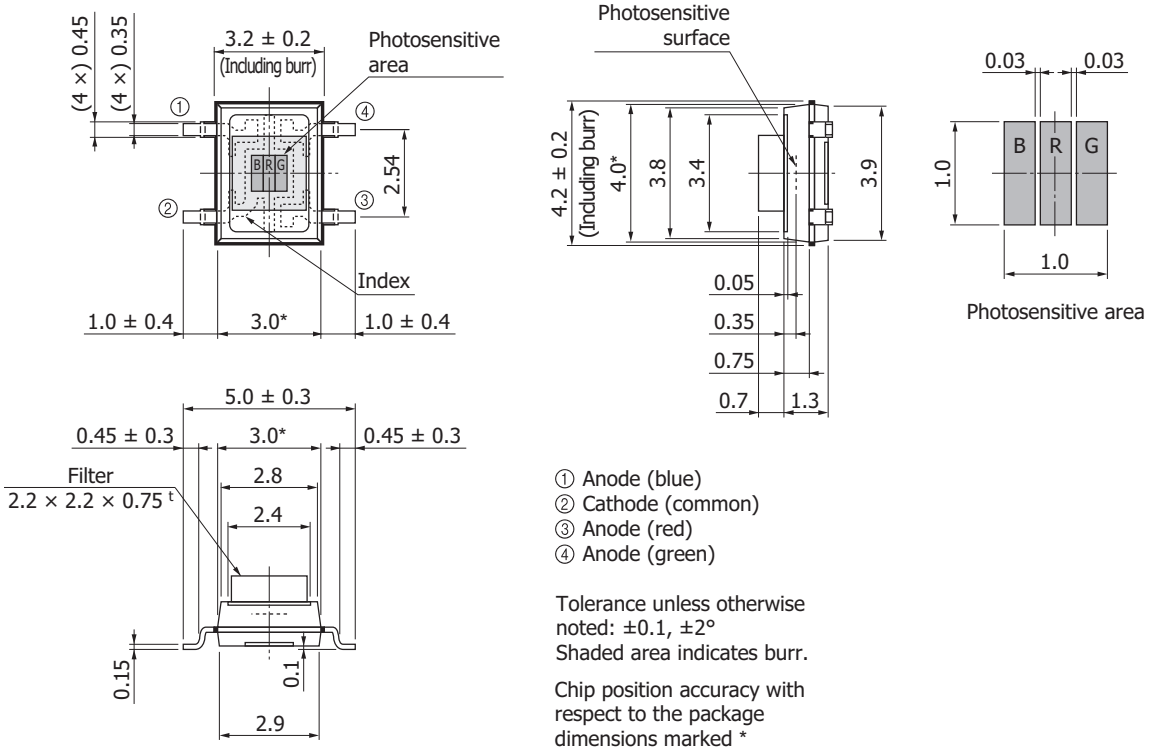
Dark current vs. reverse voltage



Terminal capacitance vs. reverse voltage



Dimensional outline (unit: mm)



① Anode (blue)
② Cathode (common)
③ Anode (red)
④ Anode (green)

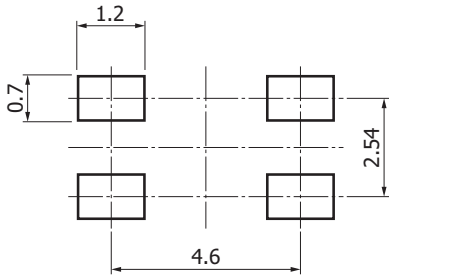
Tolerance unless otherwise noted: ±0.1, ±2°
Shaded area indicates burr.

Chip position accuracy with respect to the package dimensions marked *
X, Y≤±0.2, θ≤±2°
Lead surface finish: silver plating
Packing: stick (100 pcs/stick)

KSPDA0170EC

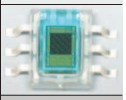
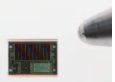
Note: If excessive vibration is continuously applied to the glass filter, there is a risk that the filter may come off, so secure the glass filter with a holder.

Recommended land pattern (unit: mm)



KPINC0029EA

Line-up of RGB color sensors

Type no.	Type	Photosensitive area (mm)	Package (mm)	Peak sensitivity wavelength (nm)	Photosensitivity	Photo
S9032-02	Photodiode	 ϕ2.0	4 × 4.8 × 1.8[t] 6 pin (filter 0.75[t])	B 460 G 540 R 620	B 0.18 (A/W) [λ=460 nm] G 0.23 (A/W) [λ=540 nm] R 0.16 (A/W) [λ=620 nm]	
S9702	Photodiode	 1.0 × 1.0	3 × 4 × 1.3[t] 4 pin (filter 0.75[t])	B 460 G 540 R 620	B 0.18 (A/W) [λ=460 nm] G 0.23 (A/W) [λ=540 nm] R 0.16 (A/W) [λ=620 nm]	
S10917-35GT	Photodiode	 1.0 × 1.0	3 × 1.6 × 1.0[t] COB (on-chip filter)	B 460 G 540 R 620	B 0.2 (A/W) [λ=460 nm] G 0.23 (A/W) [λ=540 nm] R 0.17 (A/W) [λ=620 nm]	
S10942-01CT	Photodiode	 1.0 × 1.0	3 × 1.6 × 1.0[t] COB (on-chip filter)	*	B 0.21 (A/W) [λ=460 nm] G 0.25 (A/W) [λ=540 nm] R 0.45 (A/W) [λ=640 nm]	
S9706	Digital photo IC	 1.2 × 1.2	4 × 4.8 × 1.8[t] 6 pin (filter 0.75[t])	B 465 G 540 R 615	Low: B 0.21 (LSB/lx), G 0.45 (LSB/lx), R 0.64 (LSB/lx) High: B 1.9 (LSB/lx), G 4.1 (LSB/lx), R 5.8 (LSB/lx)	
S11012-01CR	Digital photo IC	 1.2 × 1.2	3.43 × 3.8 × 1.6[t] COB (on-chip filter)	*	Low: B 0.3 (LSB/lx), G 0.6 (LSB/lx), R 1.4 (LSB/lx) High: B 2.6 (LSB/lx), G 5.3 (LSB/lx), R 12.9 (LSB/lx)	
S11059-02DT /-03DS	I²C compatible color sensor	 0.56 × 1.22	3 × 4.2 ×1.3[t] 10 pin (on-chip filter)	B 460 G 530 R 615 IR 855	Low: B 4.4 (count/lx), G 8.3 (count/lx), R 11.2 (count/lx), IR 3.0 (count/lx) High: B 44.8 (count/lx), G 85.0 (count/lx), R 117.0 (count/lx), IR 30.0 (count/lx)	
S13683-02WT	I²C compatible color sensor	 1.22 × 0.56	1.75 × 1.25 ×0.48[t] WL-CSP (on-chip filter)	R 615 G 530 B 460 IR 855	Low: R 9.48 (count/lx), G 7.61 (count/lx), B 3.35 (count/lx), IR 1.66 (count/lx) High: R 94.5 (count/lx), G 76.2 (count/lx), B 31.7 (count/lx), IR 15.3 (count/lx)	

* Refer to the spectral response of each product's datasheet.

Related information

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

■ Precautions
· Disclaimer
· Metal, ceramic, plastic package products
· Surface mount type products

Information described in this material is current as of March 2018.
Product specifications are subject to change without prior notice due to improvements or other reasons. This document has been carefully prepared and the information contained is believed to be accurate. In rare cases, however, there may be inaccuracies such as text errors. Before using these products, always contact us for the delivery specification sheet to check the latest specifications.
The product warranty is valid for one year after delivery and is limited to product repair or replacement for defects discovered and reported to us within that one year period. However, even if within the warranty period we accept absolutely no liability for any loss caused by natural disasters or improper product use.
Copying or reprinting the contents described in this material in whole or in part is prohibited without our prior permission.

HAMAMATSU www.hamamatsu.com

HAMAMATSU PHOTONICS K.K., Solid State Division
1126-1 Ichino-cho, Higashi-ku, Hamamatsu City, 435-8558 Japan, Telephone: (81) 53-434-3311, Fax: (81) 53-434-5184
U.S.A.: Hamamatsu Corporation: 360 Foothill Road, Bridgewater, N.J. 08807, U.S.A., Telephone: (1) 908-231-0960, Fax: (1) 908-231-1218, E-mail: usa@hamamatsu.com
Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49) 8152-375-0, Fax: (49) 8152-265-8, E-mail: info@hamamatsu.de
France: Hamamatsu Photonics France S.A.R.L.: 19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: 33-(1) 69 53 71 00, Fax: 33-(1) 69 53 71 10, E-mail: infos@hamamatsu.fr
United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, United Kingdom, Telephone: (44) 1707-294888, Fax: (44) 1707-325777, E-mail: info@hamamatsu.co.uk
North Europe: Hamamatsu Photonics Norden AB: Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46)8-509 031 00, Fax: (46)8-509 031 01, E-mail: info@hamamatsu.se
Italy: Hamamatsu Photonics Italia S.r.l.: Strada della Moia, 1 int. 6, 20020 Arese (Milano), Italy, Telephone: (39)02-93 58 17 33, Fax: (39)02-93 58 17 41, E-mail: info@hamamatsu.it
China: Hamamatsu Photonics (China) Co., Ltd.: B1201, Jiaming Center, No.27 Dongsanhuan Beilu, Chaoyang District, Beijing 100020, China, Telephone: (86) 10-6586-6006, Fax: (86) 10-6586-2866, E-mail: hpc@hamamatsu.com.cn
Taiwan: Hamamatsu Photonics Taiwan Co., Ltd.: 8F-3, No. 158, Section2, Gongdao 5th Road, East District, Hsinchu, 300, Taiwan R.O.C. Telephone: (886)03-659-0080, Fax: (886)03-659-0081, E-mail: info@hamamatsu.com.tw

Cat. No. KSPD1071E12 Mar. 2018 DN