

S10942-01CT

RGB color sensor integrated in small and thin package

The S10942-01CT is a color sensor molded into a plastic package having a 3-channel (RGB) photodiode sensitive to the Red ($\lambda=590$ nm Min.), Green ($\lambda=480$ to 600 nm) and Blue ($\lambda=400$ to 540 nm) regions of the spectrum. When compared to the previous model (S9702), the S10942-01CT is significantly miniaturized the package size by 80% in cubic volume and PC board mount space by 77% in area. The S10942-01CT is ideal for RGB-LCD backlight monitors installed in such as mobile phones.

Features

- Small, thin package: $3.0 \times 1.6 \times 10^{-3}$ mm
- 3-channel (RGB) Si photodiode
- Photosensitive area: 1×1 mm/3-segment (RGB)
- RoHS compliant
- Surface mount type

Applications

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

Absolute maximum ratings

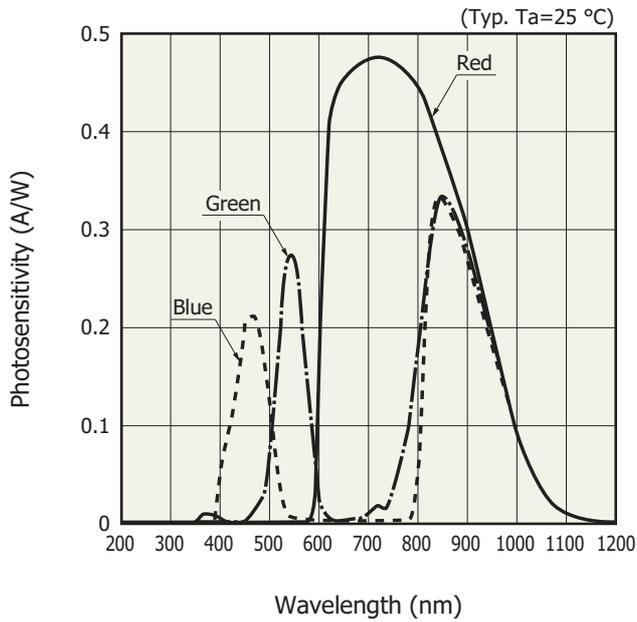
Parameter	Symbol	Value	Unit
Reverse voltage	V_R max	10	V
Operating temperature	T_{opr}	-25 to +85	°C
Storage temperature	T_{stg}	-40 to +85	°C

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 ($T_a = 25$ °C, per element)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Spectral response range	λ	Blue	-	400 to 540 800 to 1000	-	nm
		Green	-	480 to 600 760 to 1000	-	
		Red	-	590 to 1000	-	
Photosensitivity	S	Blue ($\lambda=460$ nm)	0.16	0.21	0.26	A/W
		Green ($\lambda=540$ nm)	0.20	0.25	0.30	
		Red ($\lambda=640$ nm)	0.40	0.45	0.50	
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	t_r	$V_R=0$ V, $R_L=1$ k Ω , 10 to 90%	-	0.1	1.0	μ s
Terminal capacitance	C_t	$V_R=0$ V, $f=10$ kHz	5	12	25	pF

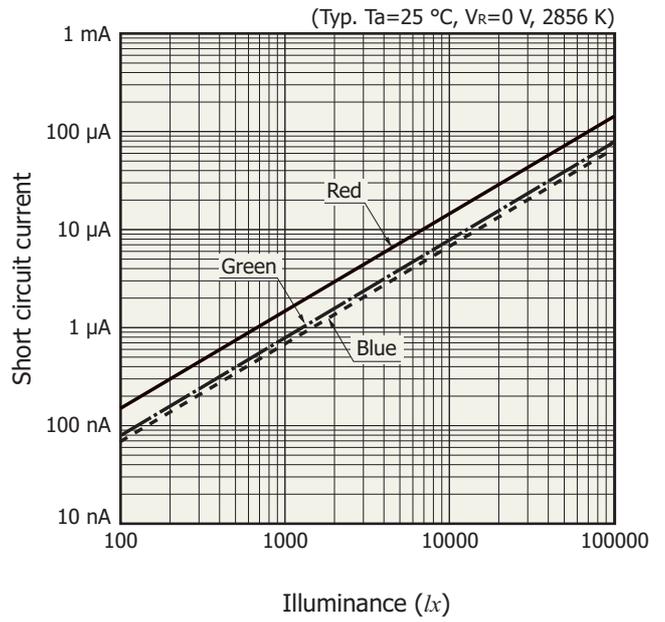
Spectral response



KSPDB0287EA

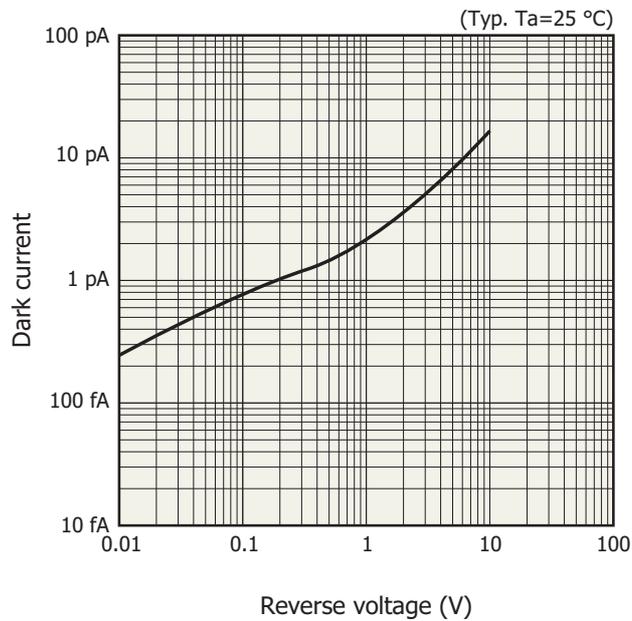
Since this photodiode has sensitivity in the infrared region, infrared light must be filtered out as needed.

Linearity



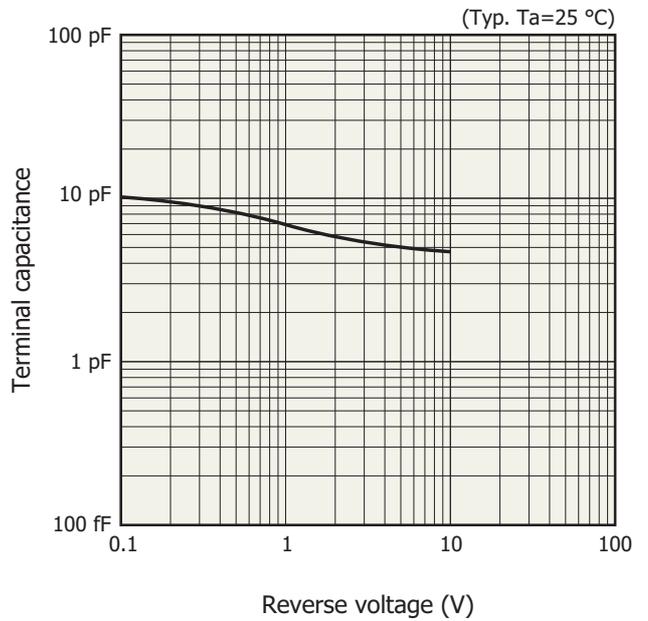
KSPDB0329EA

Dark current vs. reverse voltage



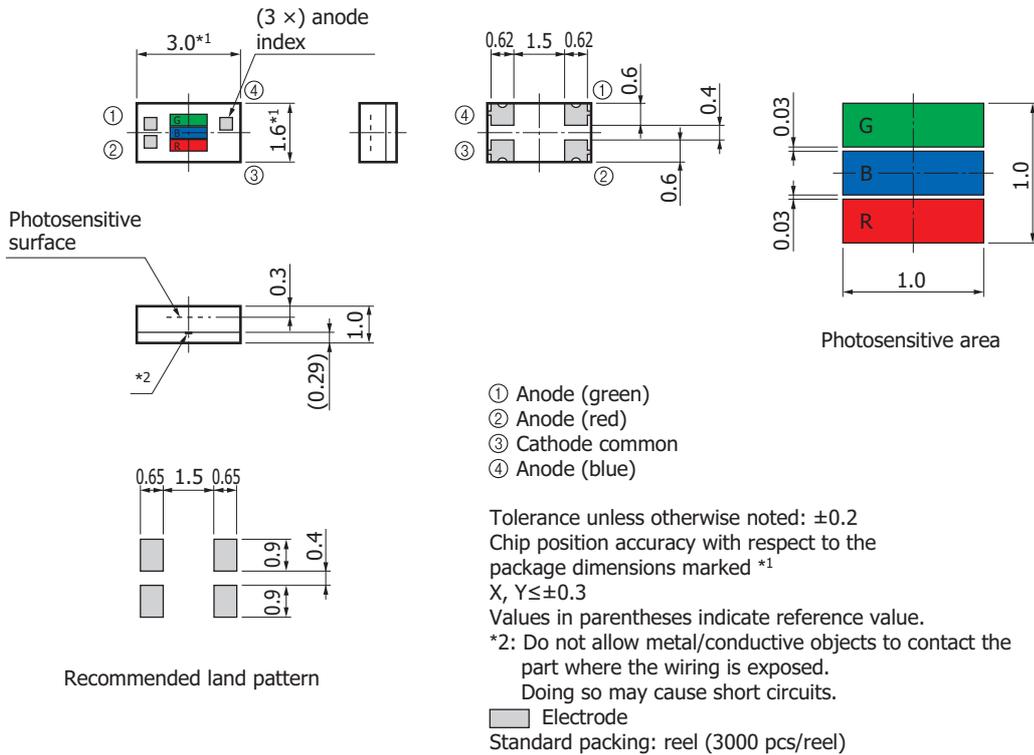
KSPDB0252EA

Terminal capacitance vs. reverse voltage



KSPDB0253EA

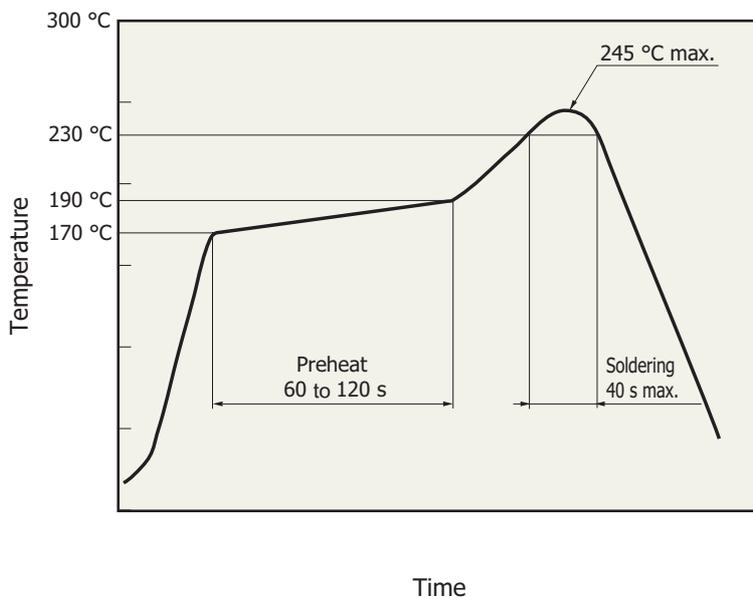
Dimensional outline (unit: mm)



KSPDA0186EB

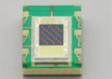
Measured example of temperature profile with our hot-air reflow oven for product testing

This product supports lead-free soldering. After unpacking, store it in an environment at a temperature of 30 °C or less and a humidity of 60% or less, and perform soldering within 24 hours.



KSPDB0139EA

Lineup of RGB color sensors

Type no.	Type	Photosensitive area (mm)	Package (mm)	Peak sensitivity wavelength (nm)	Photosensitivity				Photo		
S9032-02	Photodiode	 $\phi 2.0$	4 × 4.8 × 1.8 ^t 6 pin (filter 0.75 ^t)	B 460	B	0.18 (A/W) [$\lambda=460$ nm]					
				G 540	G	0.23 (A/W) [$\lambda=540$ nm]					
				R 620	R	0.16 (A/W) [$\lambda=620$ nm]					
S9702	Photodiode	 1.0 × 1.0	3 × 4 × 1.3 ^t 4 pin (filter 0.75 ^t)	B 460	B	0.18 (A/W) [$\lambda=460$ nm]					
				G 540	G	0.23 (A/W) [$\lambda=540$ nm]					
				R 620	R	0.16 (A/W) [$\lambda=620$ nm]					
S10917-35GT	Photodiode	 1.0 × 1.0	3 × 1.6 × 1.0 ^t COB (on-chip filter)	B 460	B	0.2 (A/W) [$\lambda=460$ nm]					
				G 540	G	0.23 (A/W) [$\lambda=540$ nm]					
				R 620	R	0.17 (A/W) [$\lambda=620$ nm]					
S10942-01CT	Photodiode	 1.0 × 1.0	3 × 1.6 × 1.0 ^t COB (on-chip filter)	*	B	0.21 (A/W) [$\lambda=460$ nm]					
					G	0.25 (A/W) [$\lambda=540$ nm]					
					R	0.45 (A/W) [$\lambda=640$ nm]					
S9706	Digital photo IC	 1.2 × 1.2	4 × 4.8 × 1.8 ^t 6 pin (filter 0.75 ^t)	B 465	Low	B	0.21 (LSB/lx)	High	B	1.9 (LSB/lx)	
				G 540		G	0.45 (LSB/lx)		G	4.1 (LSB/lx)	
				R 615		R	0.64 (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)	High	B	2.6 (LSB/lx)	
						G	0.6 (LSB/lx)		G	5.3 (LSB/lx)	
						R	1.4 (LSB/lx)		R	12.9 (LSB/lx)	
S11059-02DT /-03DS	I ² C compatible color sensor	 0.56 × 1.22	3 × 4.2 × 1.3 ^t 10 pin (on-chip filter)	B 460	Low	B	4.4 (count/lx)	High	B	44.8 (count/lx)	
				G 530		G	8.3 (count/lx)		G	85.0 (count/lx)	
				R 615		R	11.2 (count/lx)		R	117.0 (count/lx)	
				IR 855		IR	3.0 (count/lx)		IR	30.0 (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 February, 2016.

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.

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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

Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49) 8152-375-0, Fax: (49) 8152-265-8

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

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

North Europe: Hamamatsu Photonics Norden AB: Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46) 8-509-031-00, Fax: (46) 8-509-031-01

Italy: Hamamatsu Photonics Italia S.r.l.: Strada della Moia, 1 int. 6, 20020 Arese (Milano), Italy, Telephone: (39) 02-93581733, Fax: (39) 02-93581741

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