

S9032-02

## RGB color sensor

The S9032-02 is a color sensor molded into a plastic package having a 3-channel (RGB) photodiode sensitive to the blue ( $\lambda_p=460$  nm), green ( $\lambda_p=540$  nm) and red ( $\lambda_p=620$  nm) regions of the spectrum. The S9032-02 has a 3-segment (RGB) circular photosensitive area of  $\phi 2$  mm.

### 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) circular photosensitive area of  $\phi 2$  mm

### Applications

- Color adjustment for LED back light system for LCD
- Color adjustment for LCD projector
- Color tester
- 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

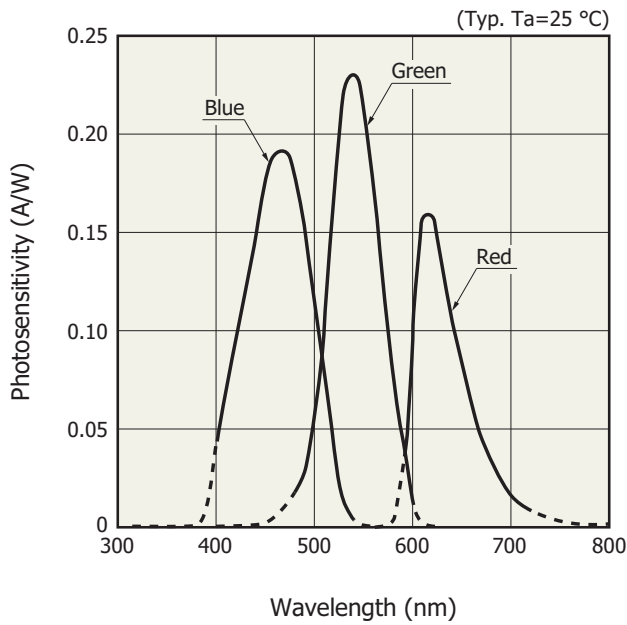
Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

### Electrical and optical characteristics ( $T_a = 25$ °C, per element )

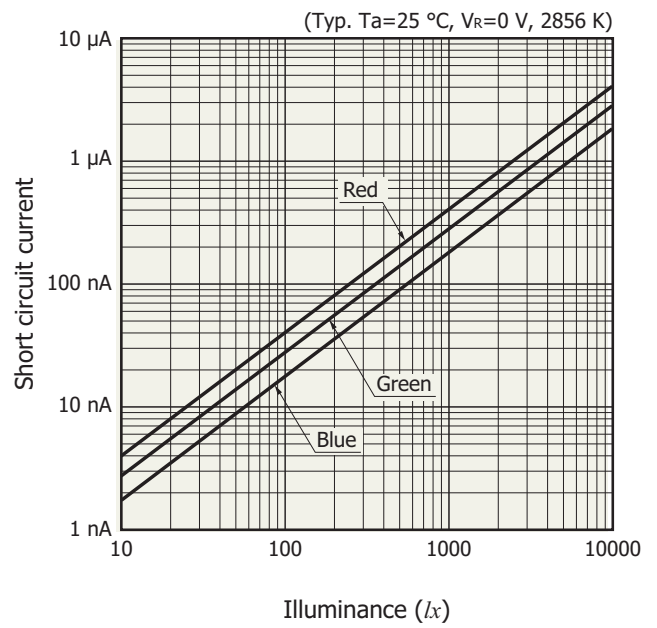
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	
Spectral response range	$\lambda$	Blue	-	400 to 540	-	nm	
		Green	-	480 to 600	-		
		Red	-	590 to 720	-		
Peak sensitivity wavelength	$\lambda_p$	Blue	-	460	-	nm	
		Green	-	540	-		
		Red	-	620	-		
Photosensitivity	S	$\lambda = \lambda_p$	Blue	0.13	0.18	-	A/W
			Green	0.18	0.23	-	
			Red	0.11	0.16	-	
Dark current	$I_D$	$V_R = 1$ V All elements	-	5	100	pA	
Temperature coefficient of $I_D$	$T_{CID}$		-	1.12	-	times/°C	
Rise time	$t_r$	$V_R = 0$ V, $R_L = 1$ k $\Omega$ 10 to 90%	-	0.2	1.0	$\mu$ s	
Terminal capacitance	$C_t$	$V_R = 0$ V $f = 10$ kHz	-	40	80	pF	

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

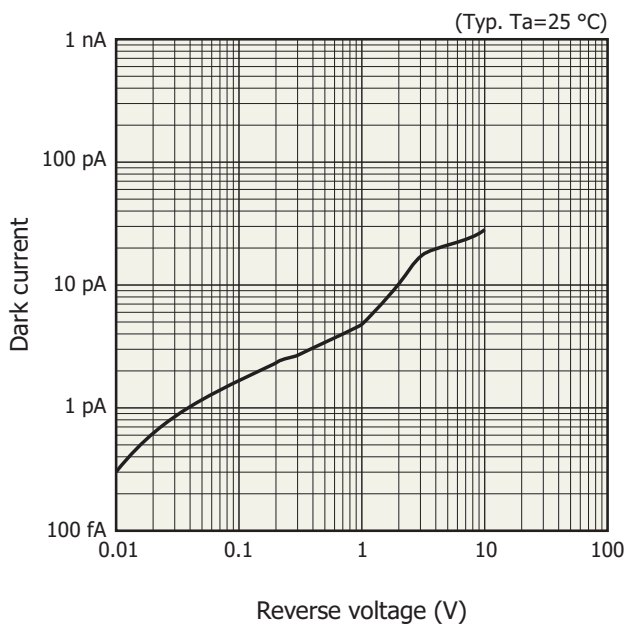
**Spectral response**



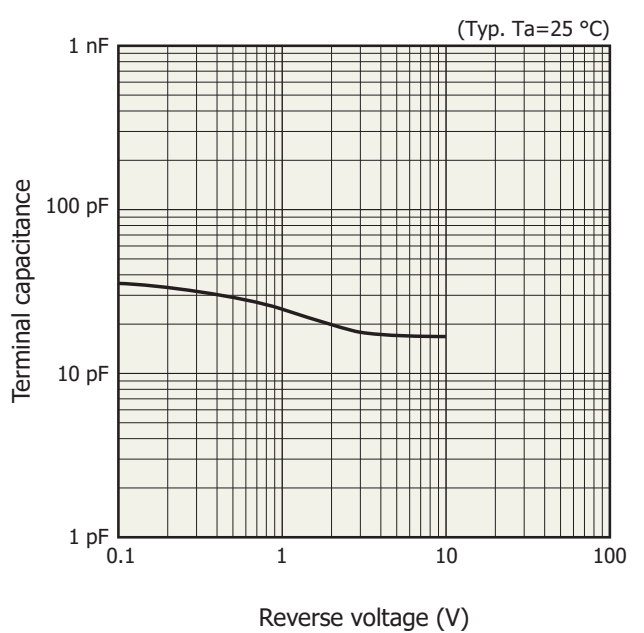
**Linearity**



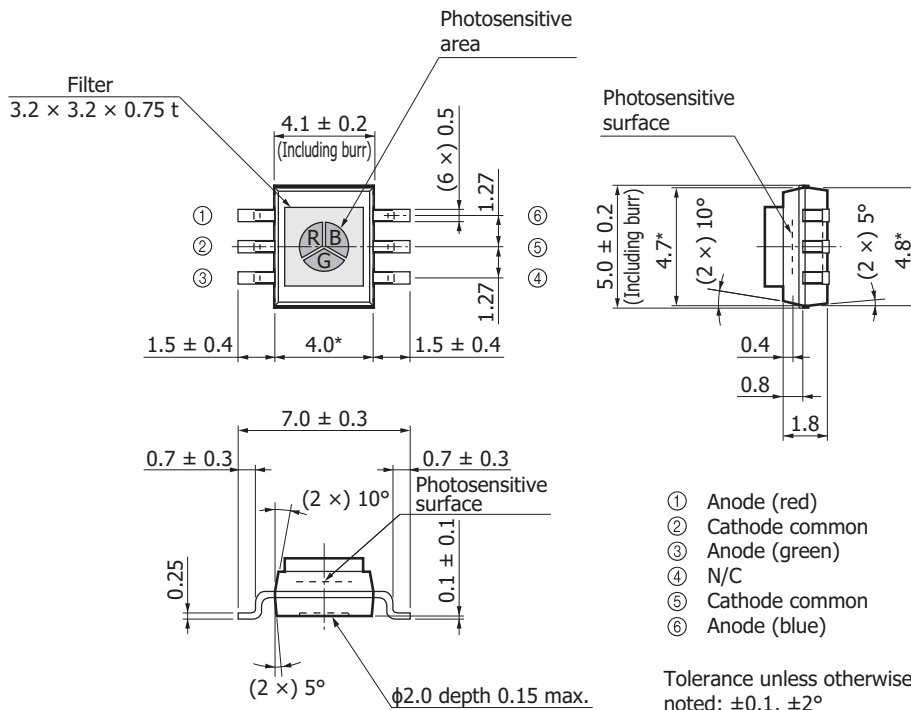
**Dark current vs. reverse voltage**



**Terminal capacitance vs. reverse voltage**



### Dimensional outline (unit: mm)

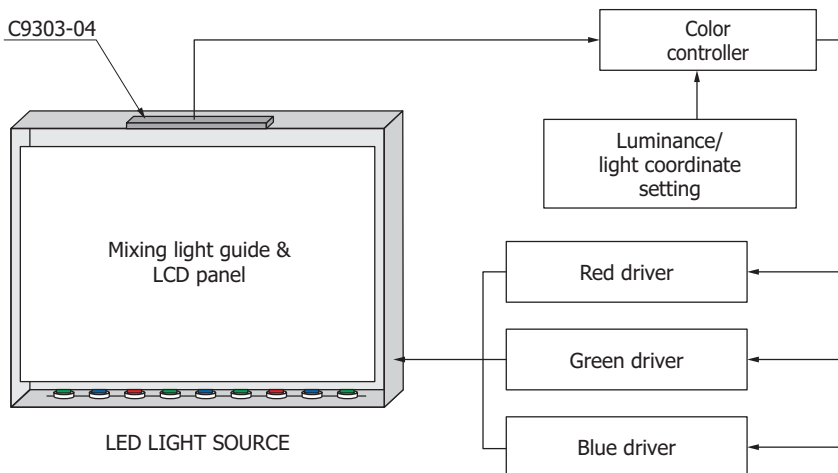


KSPDA0162EB

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.

### Application example












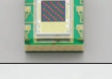


Optical feedback of backlight for TFT-LCD using a color sensor module C9303-04 (integrated with the S9032-02)



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

KACCC0289EA

## Line-up of RGB color sensors

Type no.	Type	Photosensitive area (mm)	Package (mm)	Peak sensitivity wavelength (nm)		Photosensitivity				Photo				
				B	G	B	G	R	High		B	G	R	
S9032-02	Photodiode	 $\phi 2.0$	4 × 4.8 × 1.8 <sup>t</sup> 6 pin (filter 0.75 <sup>t</sup> )	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 <sup>t</sup> 4 pin (filter 0.75 <sup>t</sup> )	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 <sup>t</sup> 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 <sup>t</sup> 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 <sup>t</sup> 6 pin (filter 0.75 <sup>t</sup> )	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	3.4 × 3.8 × 1.6 <sup>t</sup> 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 <sup>2</sup> C compatible color sensor	 0.56 × 1.22	3 × 4.2 × 1.3 <sup>t</sup> 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](http://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.

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