

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 ( $\lambda_p=460$  nm), green ( $\lambda_p=540$  nm) and red ( $\lambda_p=620$  nm) regions of the spectrum. The S9702 has a 3-segment (RGB) active area of  $\square 1$  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
- ➔ Active area: 3-segment (RGB) active area of  $\square 1$  mm

**Applications**

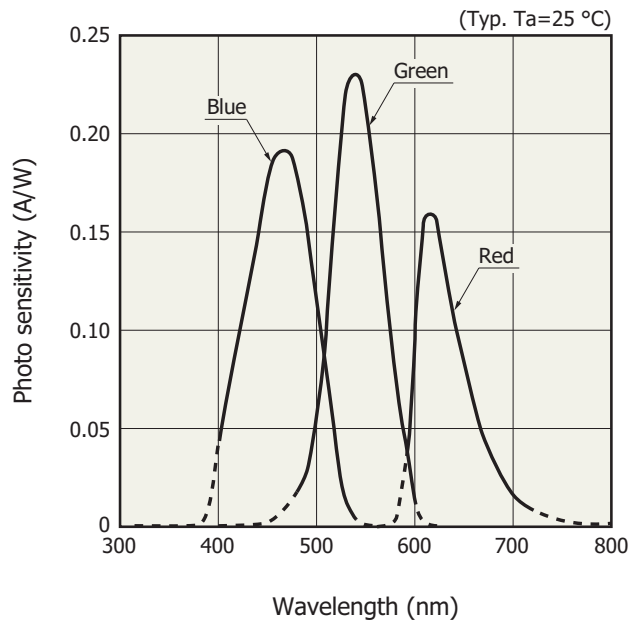
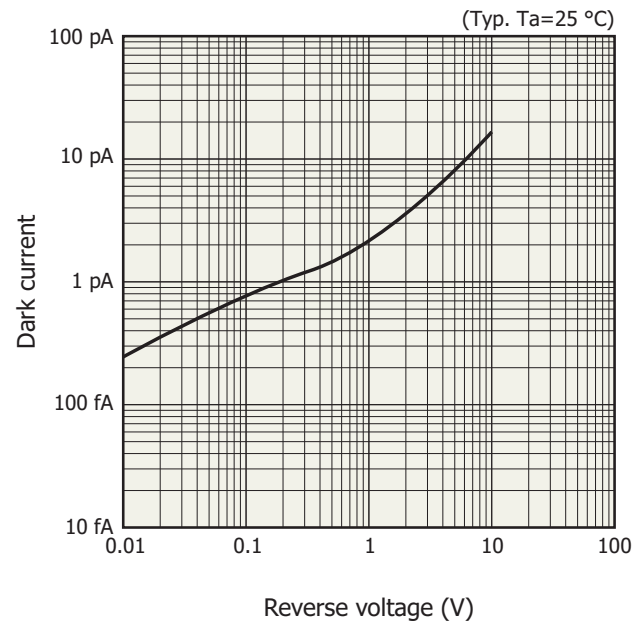
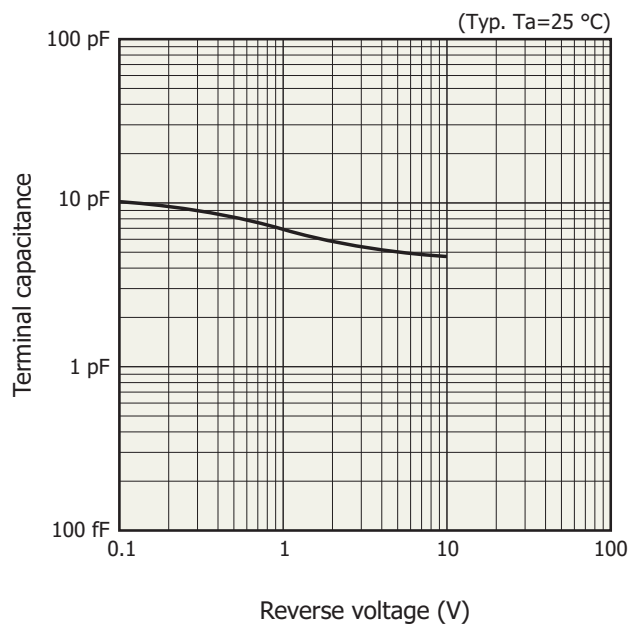
- ➔ Portable or mobile equipment
- ➔ RGB-LCD backlight monitors
- ➔ Detectors for various light sources
- ➔ Color detection

**Absolute maximum ratings**

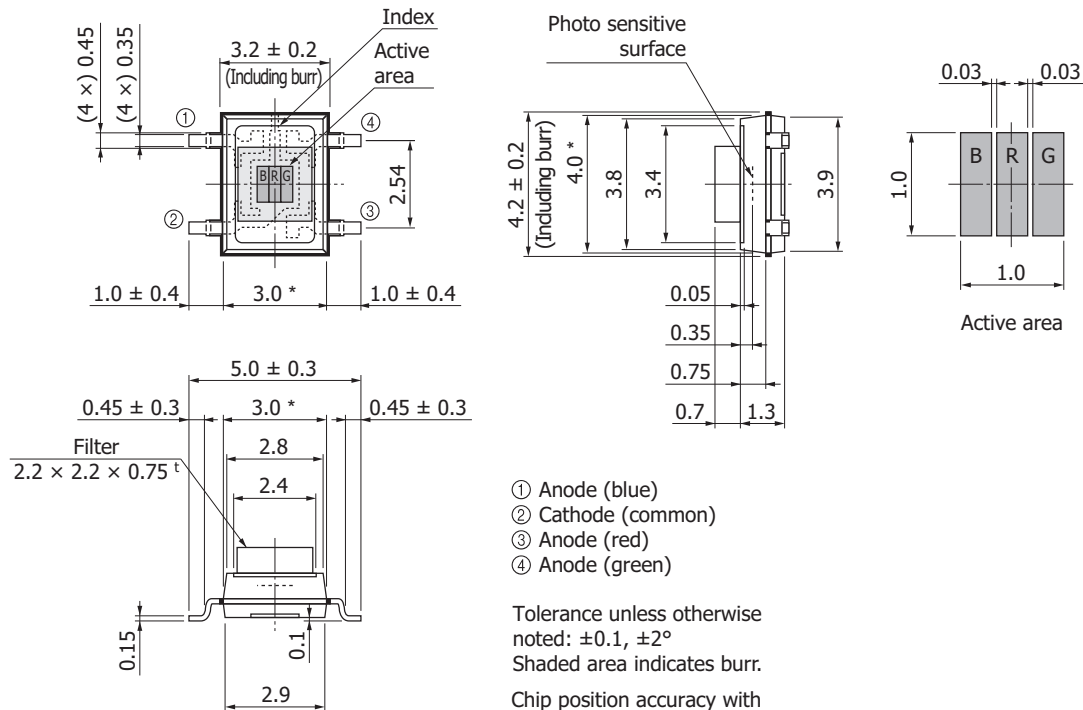
Parameter	Symbol	Value	Unit
Reverse voltage	$V_R$ Max.	10	V
Operating temperature	$T_{opr}$	-25 to +85	°C
Storage temperature	$T_{stg}$	-40 to +85	°C

**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	-		
Photo sensitivity	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	-	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 $\Omega$ 10 to 90 %	-	0.1	1.0	$\mu$ s	
Terminal capacitance	$C_t$	$V_R=0$ V, $f=10$ kHz	-	12	25	pF	

**Spectral response****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:  $\pm 0.1$ ,  $\pm 2^\circ$   
Shaded area indicates burr.

Chip position accuracy with respect to the package dimensions marked \*

X, Y  $\leq \pm 0.2$ ,  $\theta \leq \pm 2^\circ$











Lead surface finish: silver plating

Packing: stick (100 pcs/stick)

KSPDA0170EA

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.

### Line-up of RGB color sensors

Type No.	Type	Active area size (mm)	Package (mm)	Peak sensitivity wavelength (nm)	Photo sensitivity				Photo
					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)	See the spectral response.	B	0.21 A/W ( $\lambda=460$ nm)			
					G	0.25 A/W ( $\lambda=540$ nm)			
					R	0.48 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> )	Low	B 465	B	0.21 (LSB/lx)		
					G 540		0.45 (LSB/lx)		
					R 615		0.64 (LSB/lx)		
				High	B	1.9 (LSB/lx)			
					G	4.1 (LSB/lx)			
					R	5.8 (LSB/lx)			

Information described in this material is current as of November, 2010. Product specifications are subject to change without prior notice due to improvements or other reasons. Before assembly into final products, please contact us for the delivery specification sheet to check the latest information.

Type numbers of products listed in the delivery specification sheets or supplied as samples may have a suffix "(X)" which means preliminary specifications or a suffix "(Z)" which means developmental 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

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