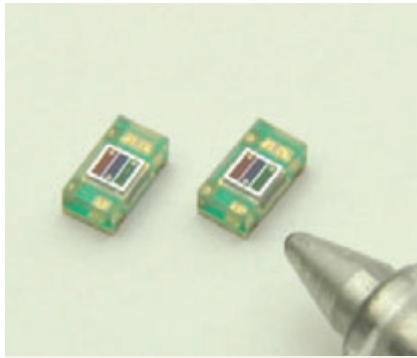


# Si photodiode



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 × 1.6 × 10 mm
- ➔ 3-channel (RGB) Si photodiode
- ➔ Active 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

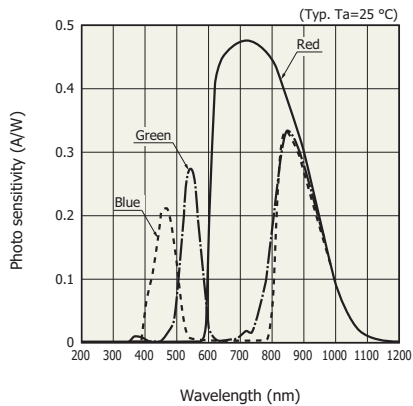
### Absolute maximum ratings

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

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

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Spectral response range	$\lambda$	Blue	-	400 to 540 800 to 1000	-	nm
		Green	-	480 to 600 760 to 1000	-	
		Red	-	590 to 1000	-	
Photo sensitivity	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 $\Omega$ , 10 to 90 %	-	0.1	1.0	$\mu$ s
Terminal capacitance	$C_t$	$V_R=0$ V, $f=10$ kHz	5	12	25	pF

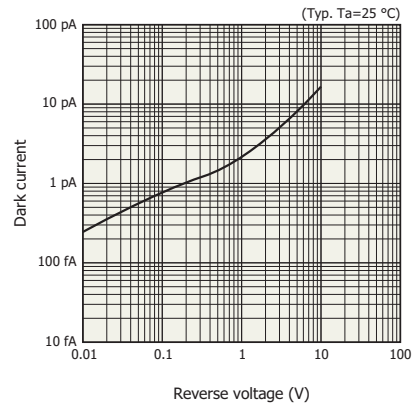
**Spectral response**



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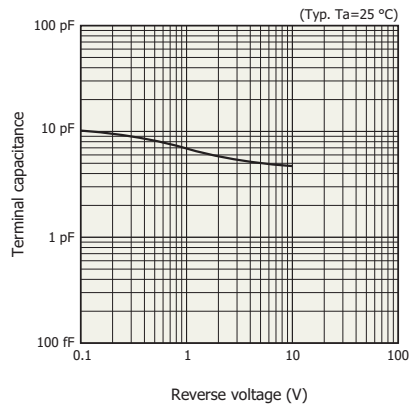
Since this photodiode has sensitivity in the infrared region, infrared light must be filtered out as needed.

**Dark current vs. reverse voltage**



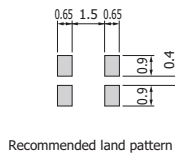
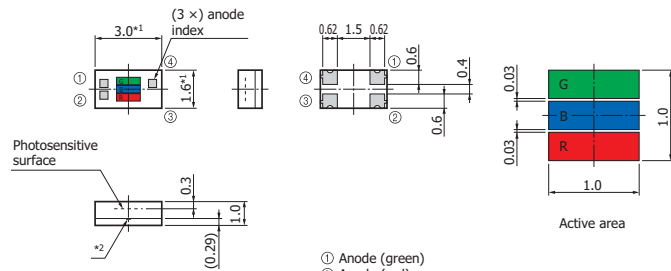
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**Terminal capacitance vs. reverse voltage**



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



**Dimensional outline (unit: mm)**



- ① Anode (green)
  - ② Anode (red)
  - ③ Cathode common
  - ④ Anode (blue)
- Tolerance unless otherwise noted: ±0.2  
 Chip position accuracy with respect to the package dimensions marked \*1  
 X, Y ±0.3  
 Values in parentheses indicate reference value  
 \*2: Do not allow metal/conductive objects to contact the part where the wiring is exposed.  
 Doing so may cause short circuits.
- Electrode  
 Packing: reel (3000 pcs/reel)

KSPDA0186EA

### Line-up of RGB color sensors

Type No.	Type	Active area size (mm)	Package (mm)	Peak sensitivity wavelength (nm)	Photo sensitivity				Photo			
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> )	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	
S11059-78HT	I <sup>2</sup> C interface-compatible color sensor	 1.22 × 0.56	1.68 × 1.18 × 0.58 <sup>t</sup> WL-CSP (on-chip filter)	B	460	Low	B	3.35 counts/lx	High	B	31.7 counts/lx	
				G	530		G	7.61 counts/lx		G	76.2 counts/lx	
				R	615		R	9.48 counts/lx		R	94.5 counts/lx	
				IR	855		IR	1.66 counts/lx		IR	15.3 counts/lx	

Information furnished by HAMAMATSU is believed to be reliable. However, no responsibility is assumed for possible inaccuracies or omissions.

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Type numbers of products listed in the specification sheets or supplied as samples may have a suffix "(X)" which means tentative specifications or a suffix "(Z)" which means developmental specifications. ©2009 Hamamatsu Photonics K.K.

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