

Si photodiode

S10170

RGB color sensor integrated in small and thin package



S10170 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), S10170 is significantly miniaturized the package size by 80 % in cubic volume and PC board mount space by 77 % in area. S10170 is ideal for RGB-LCD backlight monitors installed in such as mobile phones.

Features

- 3-channel (R, G, B) Si photodiode
- Small, thin package: $3.0 \times 1.6 \times 10$ mm
- Active area: 1×1 mm/3-segment (RGB)
- RoHS-compatible
- Surface mount type

Applications

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

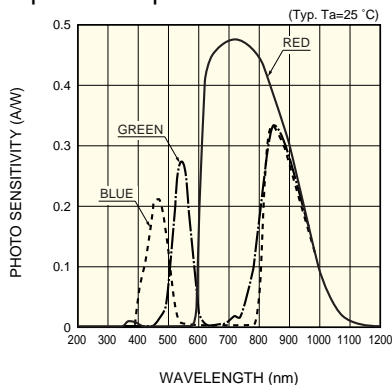
Absolute maximum ratings

Parameter	Symbol	Value	Unit
Reverse voltage	VR Max	10	V
Operating temperature	Topr	-25 to +85	°C
Storage temperature	Tstg	-40 to +100	°C

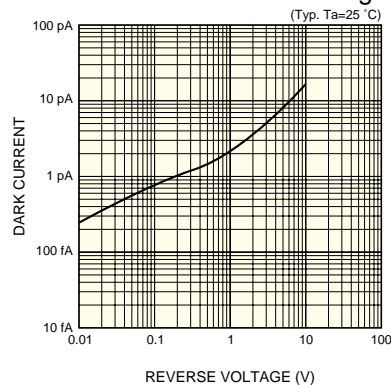
Electrical and optical characteristics (Ta=25 °C, per element)

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	-	
Photo sensitivity	S	Blue ($\lambda=460$ nm)	0.16	0.21	-	A/W
		Green ($\lambda=540$ nm)	0.23	0.28	-	
		Red ($\lambda=640$ nm)	0.40	0.45	-	
Dark current	ID	VR=1 V, All elements	-	1	50	pA
Temperature coefficient of ID	TCID		-	1.12	-	times/°C
Rise time	tr	VR=0 V, RL=1 k Ω , 10 to 90 %	-	0.1	-	μ s
Terminal capacitance	Ct	VR=0 V, f=10 kHz	-	12	25	pF

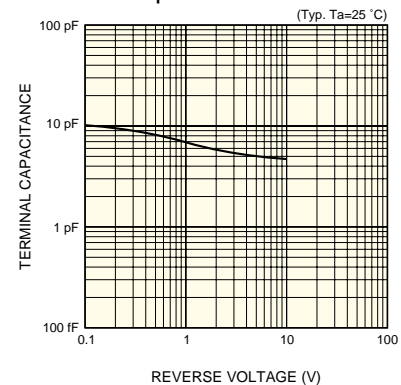
Spectral response



Dark current vs. reverse voltage



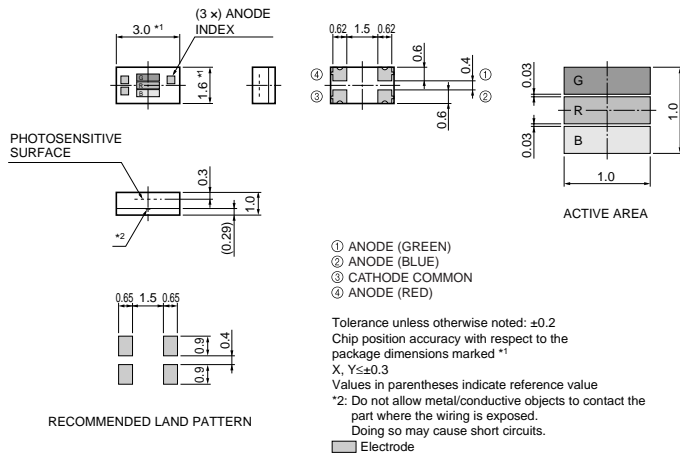
Terminal capacitance vs. reverse voltage



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

SOLID STATE DIVISION

Dimensional outline (unit: mm)



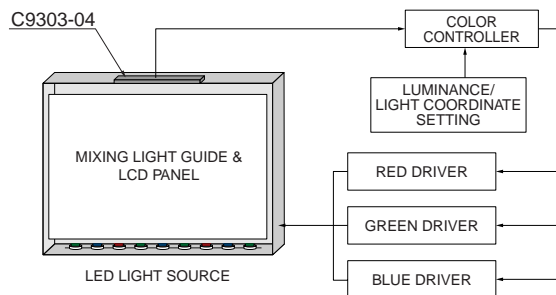
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Line-up of RGB color sensors

Type No.	Spectral response range		Peak sensitivity wavelength (nm)	Photo sensitivity $\lambda = \lambda_p$		Dark current $V_R = 1V$ all elements Max. (pA)	Active area (mm)		Package
	(nm)	(nm)		(A/W)	(A/W)		(mm)	(mm)	
S7505-01	B	400 to 540	460	B	0.18	200	B	1.5 × 1.5 (× 2)	Surface-mount type plastic
	G	480 to 600	540	G	0.23		G	1.5 × 1.5	
	R	590 to 720	620	R	0.16		R	1.5 × 1.5	
S9032-02	B	400 to 540	460	B	0.18	100	φ2/3-element		Surface-mount type plastic
	G	480 to 600	540	G	0.23				
	R	590 to 720	620	R	0.16				
S9702	B	400 to 540	460	B	0.18	50	1 × 1/3-element		Surface-mount type, miniature plastic
	G	480 to 600	540	G	0.23				
	R	590 to 720	620	R	0.16				
S8751	B	400 to 540	460	B	0.21	100	1 × 1		Surface-mount type plastic
	G	480 to 600	540	G	0.25				
	R	590 to 720	660	R	0.42				
S8752	B	400 to 540	460	B	0.21	100	1 × 1		Plastic
	R	590 to 720	660	R	0.42				

Application example

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



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

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