

S10170



RGB color sensor integrated in small and thin package

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

Features

- Small, thin package: 3.0 x 1.6 x 10 mm
- 3-channel (RGB) Si photodiode
- Active area: 1 x 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

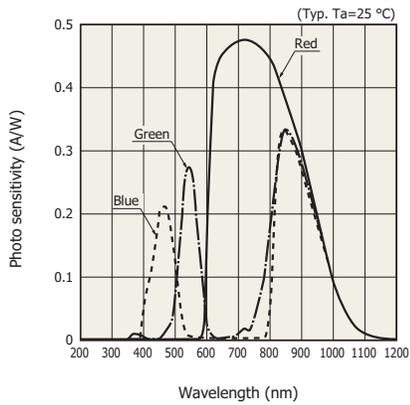
Absolute maximum ratings

Parameter	Symbol	Value	Unit
Reverse voltage	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	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	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	-	12	25	pF

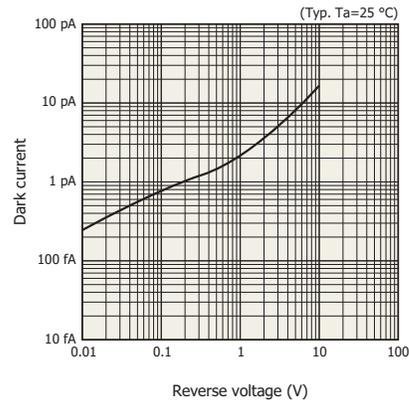
Spectral response



KSPDB0287EA

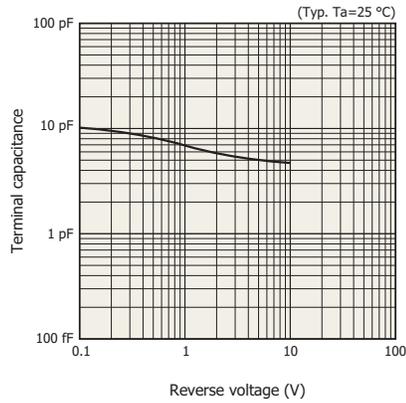
Since this photodiode has sensitivity in the infrared region, infrared light must be filtered out as needed.

Dark current vs. reverse voltage



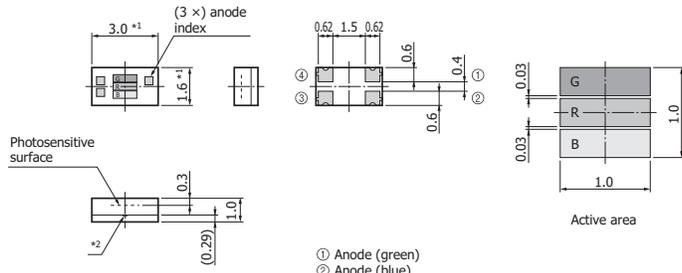
KSPDB0252EA

Terminal capacitance vs. reverse voltage



KSPDB0253EA

Dimensional outline (unit: mm)



- ① Anode (green)
- ② Anode (blue)
- ③ Cathode (common)
- ④ Anode (red)

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)

KSPDA0174EB

Line-up of RGB color sensors

Type No.		Spectral response range (nm)	Peak sensitivity wavelength (nm)	Photo sensitivity $\lambda = \lambda_p$ (A/W)	Dark current $V_R = 1$ V All elements total Max. (pA)	Active area size (mm)	Package
S7505-01	Blue	400 to 540	460	0.18	200	1.5 × 1.5 (× 2)	Surface mount type plastic
	Green	480 to 600	540	0.23		1.5 × 1.5	
	Red	590 to 720	620	0.16		1.5 × 1.5	
S9032-02	Blue	400 to 540	460	0.18	100	φ2/3 elements	Surface mount type plastic
	Green	480 to 600	540	0.23			
	Red	590 to 720	620	0.16			
S9702	Blue	400 to 540	460	0.18	50	1 × 1/3 elements	Surface mount type, small plastic
	Green	480 to 600	540	0.23			
	Red	590 to 720	620	0.16			
S10170	Blue	400 to 540 800 to 1000	See the spectral response.	0.21 *1	50	1 × 1/3 elements	Surface mount type, small and thin plastic
	Green	480 to 600 760 to 1000		0.28 *2			
	Red	590 to 1000		0.45 *3			

*1: $\lambda = 460$ nm *2: $\lambda = 540$ nm *3: $\lambda = 640$ nm

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