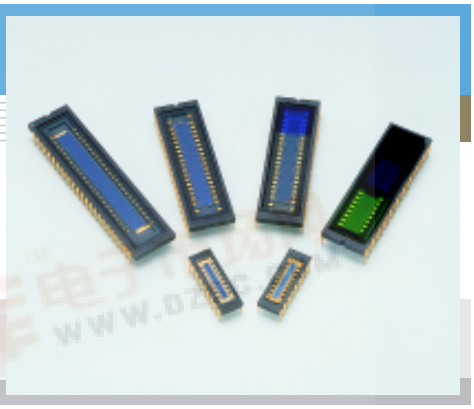


Si photodiode array
S4111/S4114 series

16, 35, 46 element Si photodiode array for UV to NIR

S4111/S4114 series are Si photodiode linear array mounted in ceramic DIPs (Dual Inline Packages). These photodiode arrays are primarily developed for low-light-level detection such as spectrophotometry, and cover a wide spectral range from UV to near infrared light. Since all elements can be used with a reverse bias for charge storage readout, S4111/S4114 series are able to detect low level light with high sensitivity. Cross-talk between elements is minimized to maintain signal purity. Special filters can be attached as the input window.

Features

- Large active area
- Low cross-talk
- Wide spectral response range
- High UV sensitivity
- Wide linearity
- S4111 series: Enhanced infrared sensitivity, low dark current
- S4114 series: Low terminal capacitance, high-speed response

Applications

- Multichannel spectrophotometers
- Color analyzers
- Light spectrum analyzers
- Light position detection

■ General ratings / Absolute maximum ratings

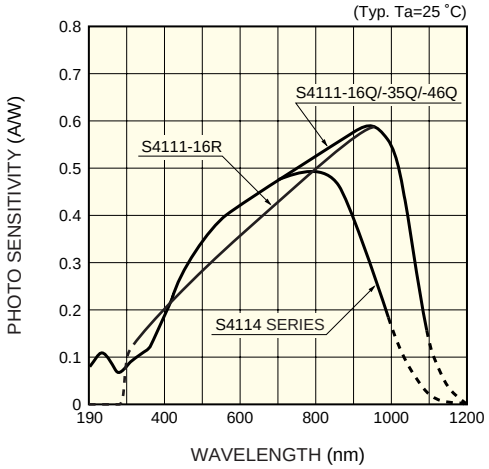
Type No.	Dimensional outline/ Window material *	Package (mm)	Active area (per 1 element) Size (mm)	Active area (per 1 element) Effective area (mm^2)	Between elements measure (mm)	Between elements pitch (mm)	Number of elements	Absolute maximum ratings: Reverse voltage V_R Max. (V)	Absolute maximum ratings: Operating temperature Topr (°C)	Absolute maximum ratings: Storage temperature Tstg (°C)
S4111-16Q	①/Q	18 pin DIP	1.45 × 0.9	1.305	0.1	1.0	16	15	-20 to +60	-20 to +80
S4111-16R	②/R									
S4111-35Q	③/Q	40 pin DIP	4.4 × 0.9	3.96			35			
S4111-46Q	④/Q	48 pin DIP					46			
S4114-35Q	③/Q	40 pin DIP					35			
S4114-46Q	④/Q	48 pin DIP					46			

■ Electrical and optical characteristics (Typ. Ta=25 °C, per 1 element, unless otherwise noted)

Type No.	Spectral response range λ (nm)	Peak sensitivity wavelength λp (nm)	Photo sensitivity S λp (A/W)	Photo sensitivity S 200 nm (A/W)	Photo sensitivity S 633 nm (A/W)	Dark current I_D Max. V_R=10 mV (pA)	Dark current I_D Max. V_R=10 V (pA)	Shunt resistance Rsh V_R=10 mV Min (GΩ)	Shunt resistance Rsh V_R=10 mV Typ. (GΩ)	Terminal capacitance Ct V_R=0 V (pF)	Terminal capacitance Ct V_R=10 V (pF)	Rise time tr R_L=1 kΩ λ=655 nm V_R=0 V (μs)	Rise time tr R_L=1 kΩ λ=655 nm V_R=10 V (μs)	NEP λ=λp V_R=0 V ($W/Hz^{1/2}$)	NEP λ=λp V_R=10 V ($W/Hz^{1/2}$)
S4111-16Q	190 to 1100	960	0.58	0.08	0.43	5	25	2.0	250	200	50	0.5	0.1	4.4×10^{-16}	1.7×10^{-15}
S4111-16R	320 to 1100			-	0.39										
S4111-35Q	190 to 1100			0.08	0.43	10	50	1.0	30	550	120	1.2	0.3	1.3×10^{-15}	3.1×10^{-15}
S4111-46Q															
S4114-35Q	190 to 1000	800	0.50			60	300	0.15	2	35	20	0.1	0.05	5.7×10^{-15}	8.0×10^{-15}
S4114-46Q															

* Window material R: resin coating, Q: quartz glass

■ Spectral response



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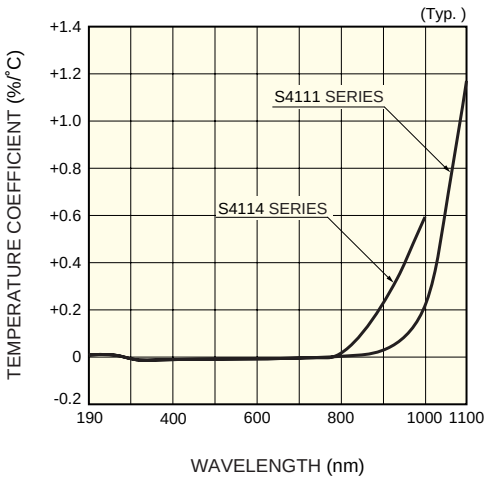
■ Photo sensitivity temperature characteristics



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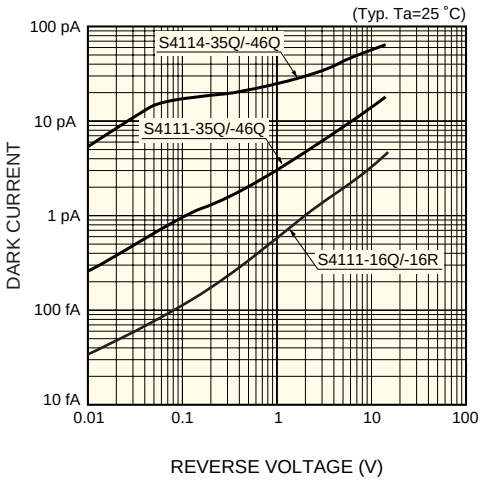
■ Dark current vs. reverse voltage



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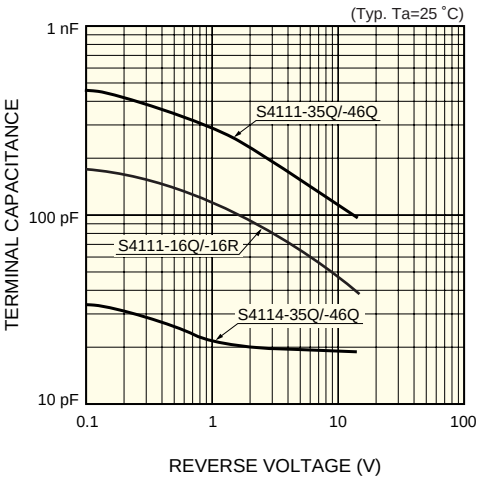
■ Terminal capacitance vs. reverse voltage



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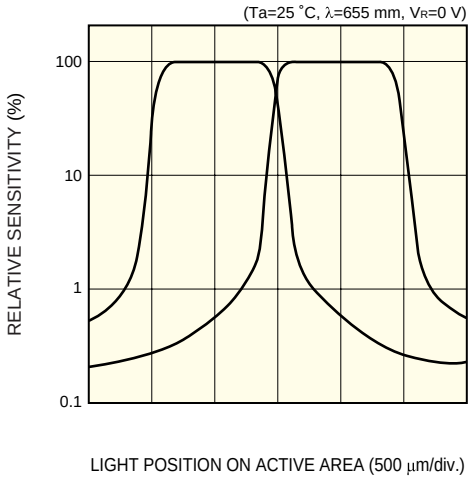
■ Example of cross-talk

S4111 series



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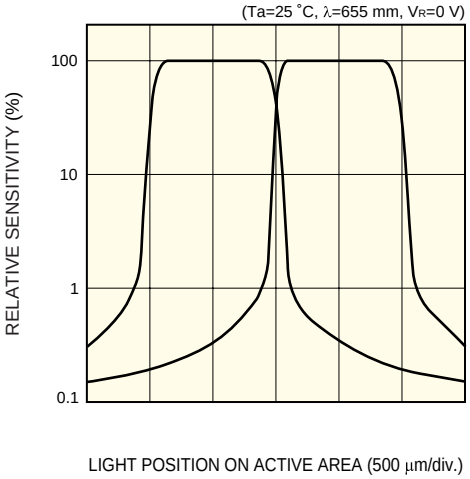
S4114 series



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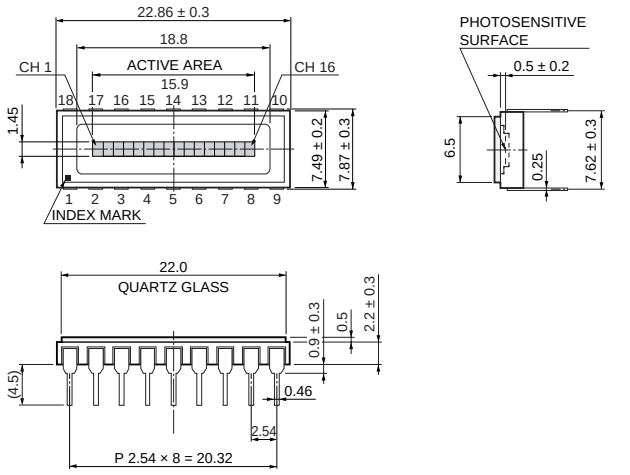
■ Dimensional outlines (unit: mm)

① S4111-16Q



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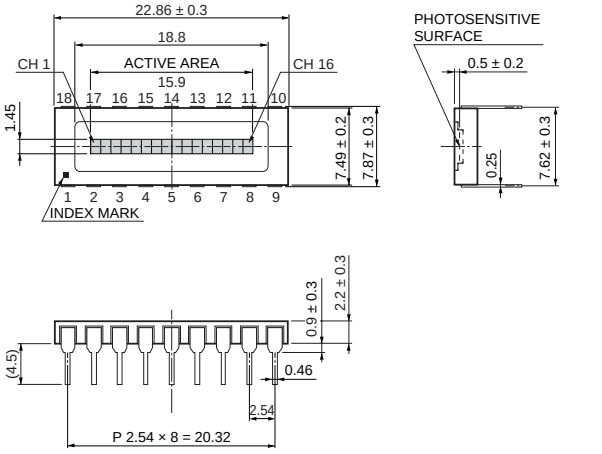
② S4111-16R



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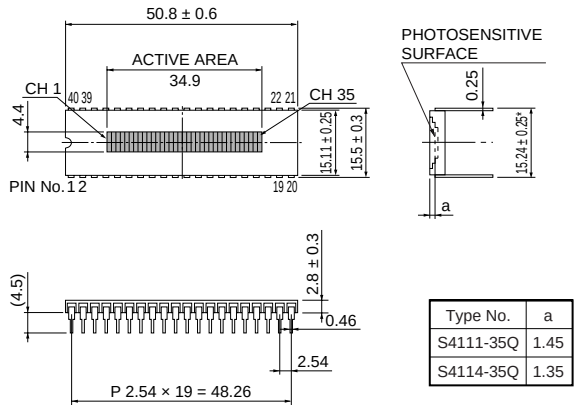
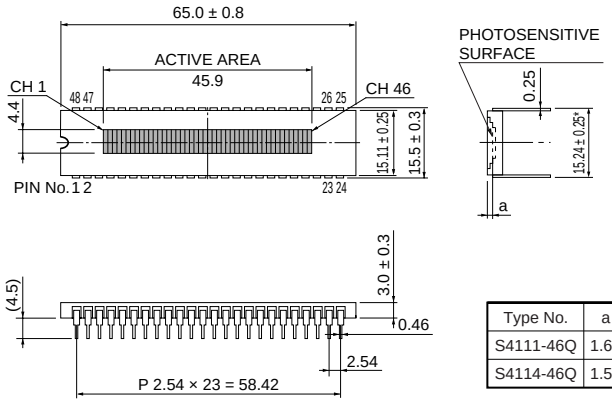
③ S4111-35Q, S4114-35Q



Type No.	a
S4111-35Q	1.45
S4114-35Q	1.35

KMPDA0019EC

④ S4111-46Q, S4114-46Q



Type No.	a
S4111-46Q	1.65
S4114-46Q	1.55

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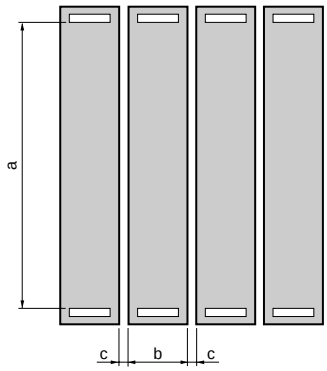
■ Details of elements (for all types)



	a	b	c
S4111-16Q/16R	1.45	0.9	0.1
S4111-35Q/46Q S4114-35Q/46Q	4.4	0.9	0.1

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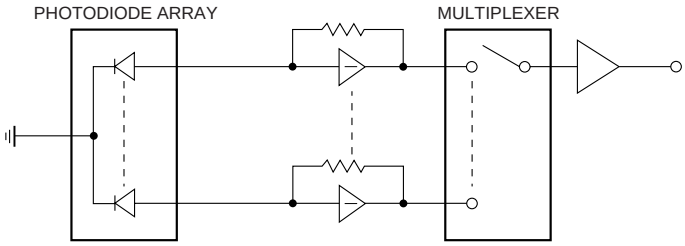
■ Pin connections

Pin No.	16-element type	35-element type	46-element type
1	KC	KC	KC
2	2	2	2
3	4	4	4
4	6	6	6
5	8	8	8
6	10	10	10
7	12	12	12
8	14	14	14
9	16	16	16
10	KC	18	18
11	15	NC	20
12	13	20	22
13	11	22	24
14	9	24	26
15	7	26	28
16	5	28	30
17	3	30	32
18	1	32	34
19		34	36
20		NC	38
21		KC	40
22		35	42
23		33	44
24		31	46
25		29	KC
26		27	45
27		25	43
28		23	41
29		21	39
30		19	37
31		17	35
32		15	33
33		13	31
34		11	29
35		9	27
36		7	25
37		5	23
38		3	21
39		1	19
40		NC	17
41			15
42			13
43			11
44			9
45			7
46			5
47			3
48			1

■ Operating circuits

① In the most generally used circuit, operational amplifiers are connected to each channel to read the output in real time. The output of an operational amplifier is of low impedance and thus can be easily multiplexed.



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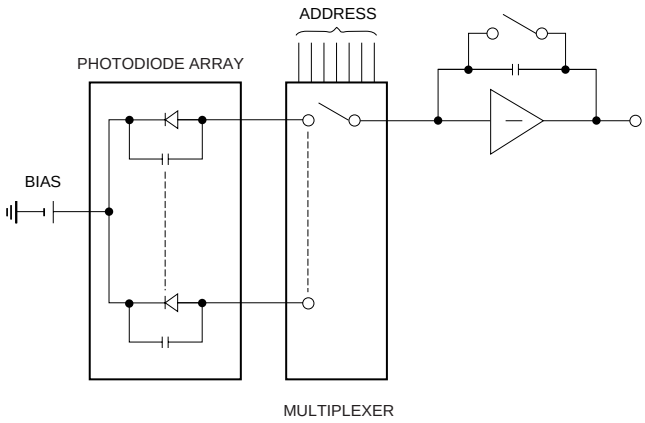
② In the charge storage readout method, the charge stored in the junction capacitance of each channel, which is proportional to the incident light intensity, can be read out in sequence by a multiplexer. With this method, reverse voltage must be applied to the photodiodes, so S4111 and S4114 series are suitable. One amplifier is sufficient but care should be taken regarding noise, dynamic range, etc.



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