

16-element Si photodiode array

S5668 series



Long and narrow format by multiple arrays

The S5668 series is a 16-element Si photodiode linear array. Each element has an active area of 1.175 mm (width) × 2.0 mm (height) and is arrayed at an element pitch of 1.575 mm. The entire linear array is mounted on a 25.4 mm (1 inch) long PC board. By linearly arranging two or more pieces of the S5668 series, a long and narrow photodiode array can be easily configured at the same element pitch. For X-ray detection applications, the S5668-121 with a CsI (TI) scintillator, the S5668-321 with a ceramic scintillator and the S5668-421 with a fluorescent paper are also available.

Features

- Active area: 1.175 × 2.0 mm/one element
- Element pitch: 1.575 mm
- Mounted on a 1-inch (25.4 mm) long PC board
- Long and narrow format by multiple arrays

Applications

- Non-destructive inspection, etc.

Selection guide

Type No.	Scintillator	Scintillator specifications		Application example
		Afterglow	Cross-talk	
S5668-021	None (epoxy resin potting)	-	-	General photometry
S5668-121	CsI (TI)	Large	Low	X-ray non-destructive inspection of slow-moving objects (baggage inspection, etc.) X-ray applications where signal can be integrated
S5668-321	Ceramic	Small	Low	X-ray non-destructive inspection of fast-moving objects (baggage inspection, etc.)
S5668-421	Phosphor sheet	Small	May occur.	X-ray non-destructive inspection (at low X-ray intensity)



Handling precautions

CsI scintillator of the S5668-121 has deliquescence. Avoid storing or using the S5668-121 at high humidity.

Absolute maximum ratings

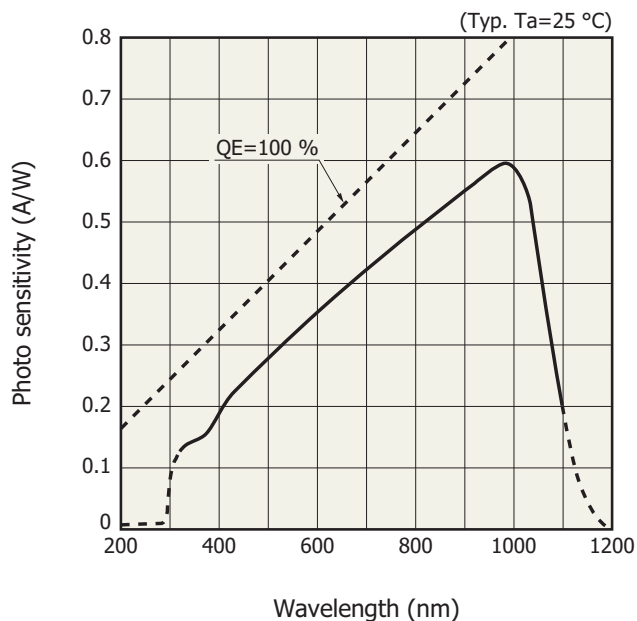
Parameter	Symbol	S5668-021	S5668-121/-321/-421	Unit
Reverse voltage	V_R Max.	10	10	V
Operating temperature	T_{opr}	-20 to +60	-10 to +60	°C
Storage temperature	T_{stg}	-20 to +80	-20 to +70	°C

Electrical and optical characteristics (Ta=25 °C, per 1 element)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Spectral response range	λ		-	320 to 1100	-	nm
Peak sensitivity wavelength	λ_p		-	960	-	nm
Photo sensitivity	S	$\lambda=540$ nm	0.27	0.31	0.35	A/W
		$\lambda=\lambda_p$	0.54	0.60	0.66	
Dark current	I_D	$V_R=10$ mV	-	5	30	pA
Rise time	t_r	$V_R=0$ V, $R_L=1$ k Ω 10 to 90 %	-	0.1	-	μ s
Terminal capacitance	C_t	$V_R=0$ V, $f=10$ kHz	20	30	40	pF
Noise equivalent power	NEP	$V_R=0$ V, $\lambda=540$ nm	-	9.3×10^{-15}	-	W/Hz ^{1/2}
X-ray sensitivity	iscX	*	-021	-	-	nA
			-121	-	6.8	
			-321	-	2.8	
			-421	-	3.2	

* These are for reference (X-ray tube voltage 120 kV, tube current 1.0 mA, aluminum filter $t=6$ mm, distance 830 mm), X-ray sensitivity depends on the X-ray equipment operating and setup conditions.

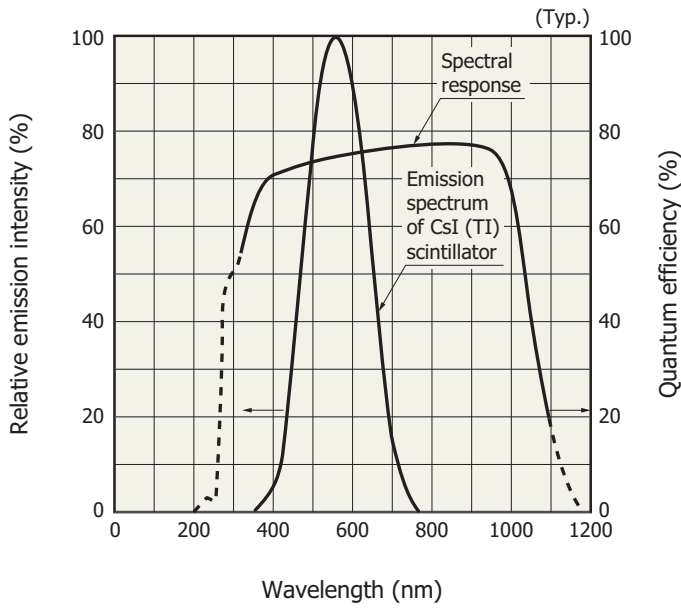
Spectral response



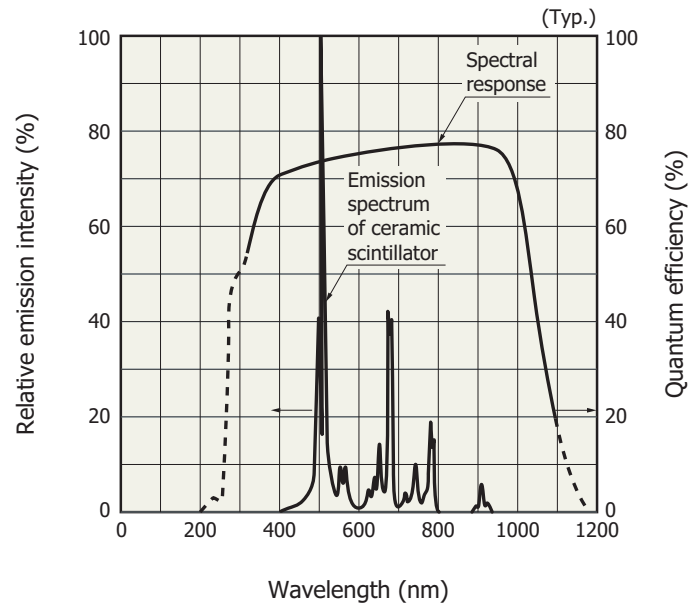
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■ Emission spectrum of scintillator and spectral response

S5668-121



S5668-321

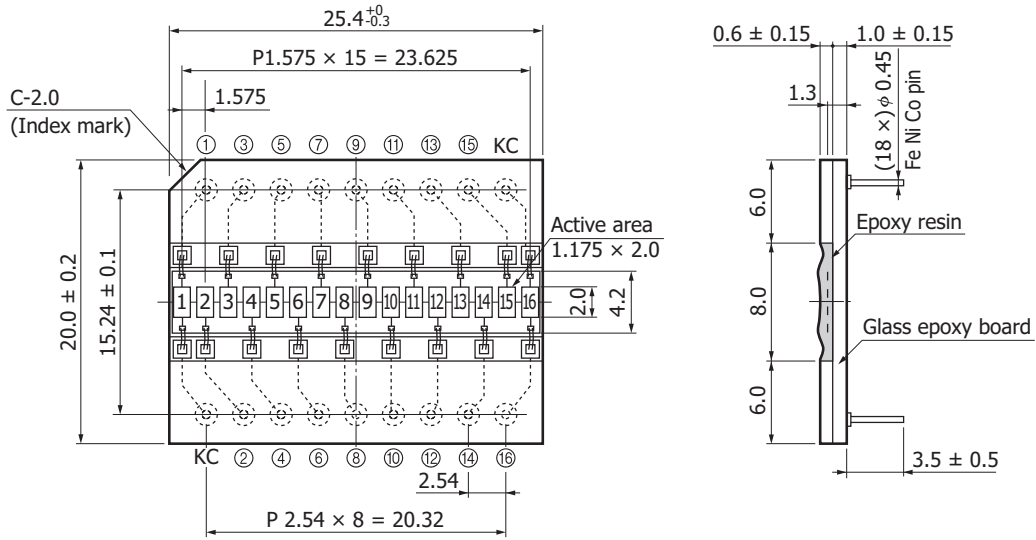


■ Typical scintillator characteristics

Parameter	Condition	CsI (TI)	Ceramic scintillator	Unit
Peak emission wavelength		560	520	nm
X-ray absorption coefficient	100 keV	10	7	-
Refractive index	at peak emission wavelength	1.74	2.2	-
Decay constant		1	3	μs
Afterglow	100 ms after X-ray turn off	0.3	0.01	%
Density		4.51	7.34	g/cm ³
Relative emission intensity	CWO=1.0	1.8	1.2	-
Color		Transparent	Light yellow-green	-
Sensitivity non-uniformity		±10	±5	%

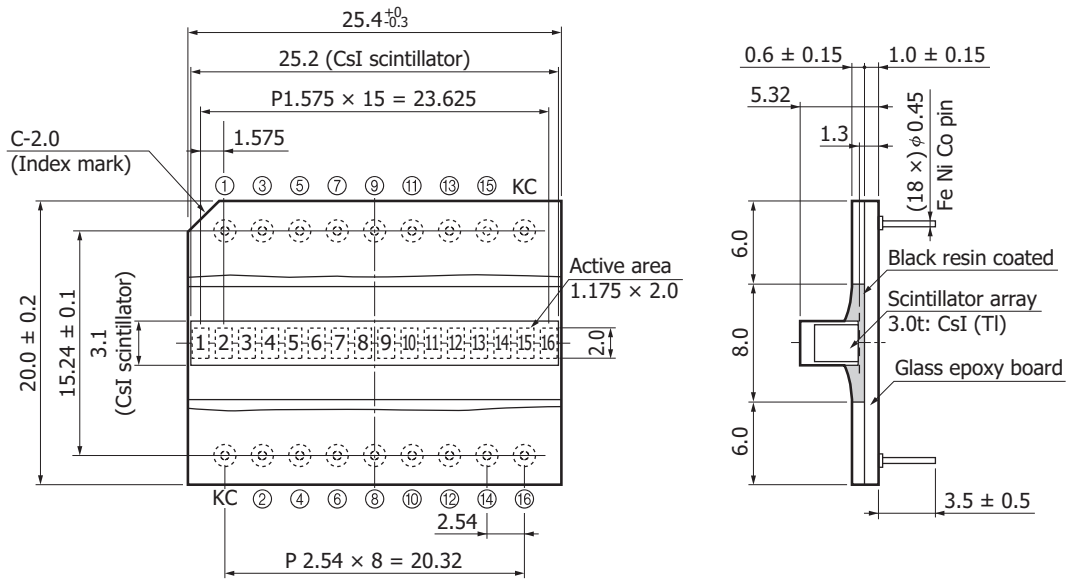
Dimensional outlines (unit: mm, tolerance: ± 1 mm unless otherwise noted)

S5668-021



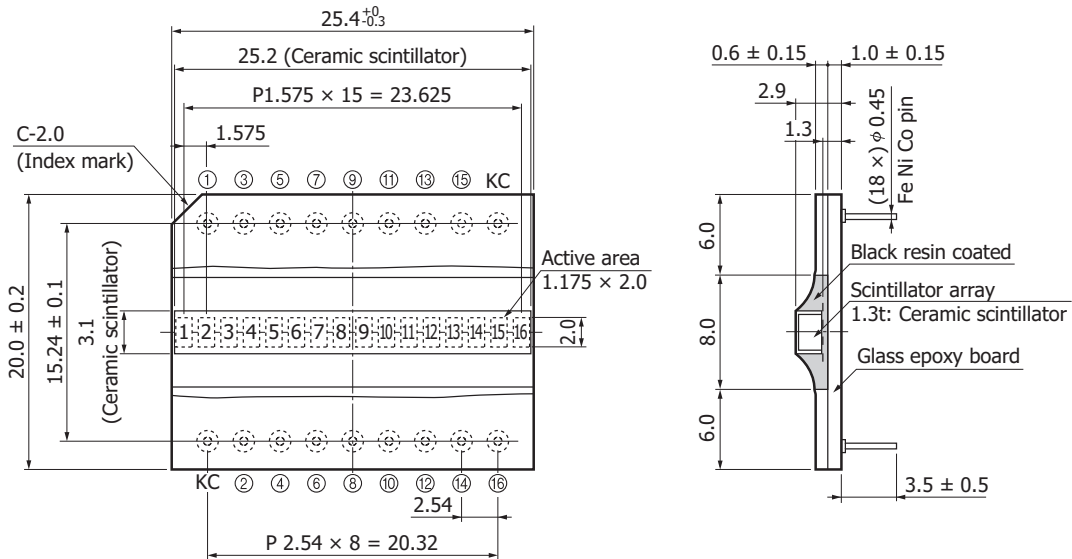
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S5668-121



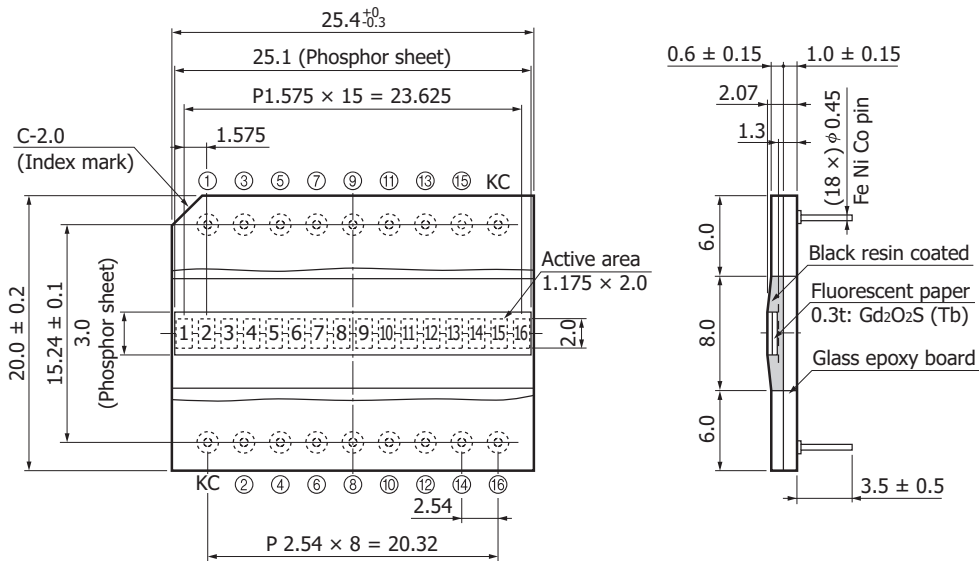
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S5668-321



KMPDA0231EA

S5668-421



KMPDA0232EA

HAMAMATSU also provides the C9004 driver circuit for Si photodiode arrays, that allows direct mounting of the S5668 series on the circuit board.

Information furnished by HAMAMATSU is believed to be reliable. However, no responsibility is assumed for possible inaccuracies or omissions. Specifications are subject to change without notice. No patent rights are granted to any of the circuits described herein. ©2008 Hamamatsu Photonics K.K.

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