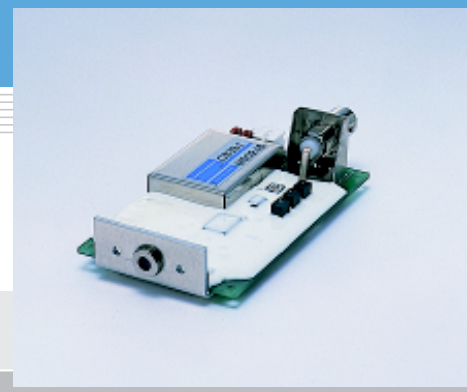


APD module

C5331 series

Operates an APD with single 5 V supply



Features

- Choice of high sensitivity APDs
A total of 11 types are available, including 6 types of 800 nm band APDs with active areas from $\phi 0.2$ to $\phi 5$ mm, 3 types of short-wavelength APDs with active areas from $\phi 1$ to $\phi 5$ mm, and FC connector types.
- High sensitivity detection board optimized for APD evaluation
An APD and high-speed current-to-voltage amplifier circuit are mounted on a compact board. The high-speed current-to-voltage amplifier circuit features a low-noise configuration ideal for the APD signal readout and operates at high speeds yet with high sensitivity.
- Easy handling
Single 5 V supply operation
- Built-in temperature-compensated bias voltage circuit
Controls the bias voltage with a thermosensor to keep the APD gain constant. Gain is stabilized to as low as $\pm 2.5\%$ Typ. at ambient temperatures of $25 \pm 10^\circ\text{C}$. Ripple noise usually inherent to high voltage power supplies is also minimized.
- Compact and lightweight
The circuit board is no larger than business card size, and weighs only 52 g.
- Low price
- Custom devices available with different dimensions and specifications

Selection guide

Type No.	Active area (mm)	Frequency bandwidth -3 dB (Hz)	Type of APD	Peak sensitivity wavelength (nm)
C5331	$\phi 1.5$	4 k to 100 M	Standard type	800
C5331-30 *1				
C5331-01	$\phi 0.2$			
C5331-31 *2				
C5331-02	$\phi 0.5$			
C5331-03	$\phi 1.0$	4 k to 80 M	Short-wavelength type	620
C5331-04	$\phi 3.0$			
C5331-05	$\phi 5.0$	4 k to 50 M		
C5331-11	$\phi 1.0$	4 k to 100 M		
C5331-12	$\phi 3.0$	4 k to 40 M		
C5331-13	$\phi 5.0$	4 k to 20 M		

*1: C5331 + FC connector

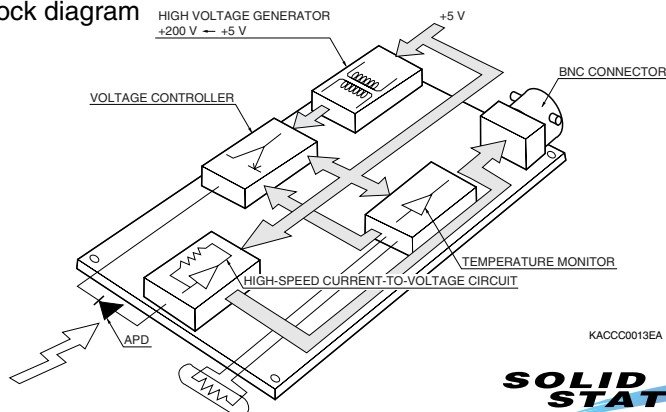
*2: C5331-01 + FC connector with lens
(compatible with GI 50/125 fiber)

Note: Gain is preset to 30 prior to shipping.

Applications

- APD evaluation
- Spatial light transmission
- Bar code readers
- Laser radars
- Optical rangefinders
- Optical communications

Block diagram



KACCC0013EA

SOLID STATE DIVISION

■ General ratings / Absolute maximum ratings

Type No.	Active area (mm)	Supply voltage			Current consumption		Board dimension (mm)	Output impedance (Ω)	Weight (g)	Absolute maximum ratings		
		Min. (V)	Typ. (V)	Max. (V)	Typ. (mA)	Max. (mA)				Supply voltage (V)	Operating temperature Topr (°C)	Storage temperature Tstg (°C)
C5331	$\phi 1.5$	+4.75	+5	+5.25	+50	+80	80 × 50 × 23	50	52	+7	0 to +60	-55 to +100
C5331-30												
C5331-01	$\phi 0.2$											
C5331-31												
C5331-02	$\phi 0.5$											
C5331-03	$\phi 1.0$											
C5331-04	$\phi 3.0$											
C5331-05	$\phi 5.0$											
C5331-11	$\phi 1.0$											
C5331-12	$\phi 3.0$											
C5331-13	$\phi 5.0$											

■ Electrical and optical characteristics (Typ. Ta=25 °C, Vcc=5 V, unless otherwise noted)

Photoelectric converter section (APD)

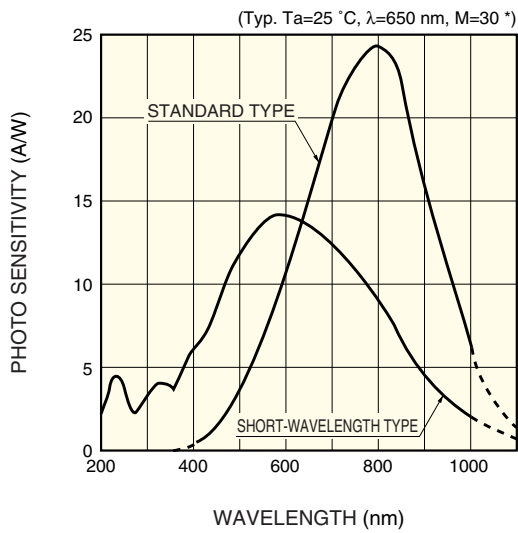
Type No.	Spectral response range λ (nm)	Peak sensitivity wavelength λ_p (nm)	Photo sensitivity S		Temperature stability of gain ^{*3} 25 °C ± 10 °C, Gain=30	
			λ =800 nm, Gain=1 (A/W)	λ =620 nm, Gain=1 (A/W)	Typ. (%)	Max. (%)
C5331	400 to 1000	800	0.5	-	±2.5	±5
C5331-30						
C5331-01						
C5331-31						
C5331-02						
C5331-03						
C5331-04						
C5331-05						
C5331-11	200 to 1000	620	-	0.42		
C5331-12						
C5331-13						

High-speed amplifier section

Type No.	Cut-off frequency -3 dB				NEP				Feedback resistance	Photoelectric sensitivity *3 including APD, gain=30		
	High band		Low band		$\lambda=800$ nm		$\lambda=620$ nm			Min. (10 ⁴ V/W)	Typ. (10 ⁴ V/W)	Max. (10 ⁴ V/W)
	Min. (MHz)	Typ. (MHz)	Min. (kHz)	Typ. (kHz)	Typ. (pW/Hz ^{1/2})	Max. (pW/Hz ^{1/2})	Typ. (pW/Hz ^{1/2})	Max. (pW/Hz ^{1/2})				
C5331	90	100	3	4	0.3	0.6	-	-	6.2	-4.3	-4.5	-4.7
C5331-30							-	-				
C5331-01	90	100			0.3	0.6	-	-	10	-7.1	-7.5	-7.9
C5331-31							-	-				
C5331-02	90	100			0.3	0.6	-	-	10	-7.1	-7.5	-7.9
C5331-03	90	100			0.3	0.6	-	-	9.1	-6.4	-6.75	-7.1
C5331-04	70	80			0.4	0.8	-	-	3.0	-2.1	-2.3	-2.4
C5331-05	40	50			0.7	1.4	-	-	1.1	-0.7	-0.75	-0.79
C5331-11	90	100			-	-	0.5	1.0	3.9	-2.3	-2.46	-2.7
C5331-12	30	40			-	-	1.3	2.6	2.0	-1.1	-1.26	-1.4
C5331-13	10	20			-	-	1.7	3.4	1.1	-0.65	-0.69	-0.75

*3: Gain is preset to 30 prior to shipping.

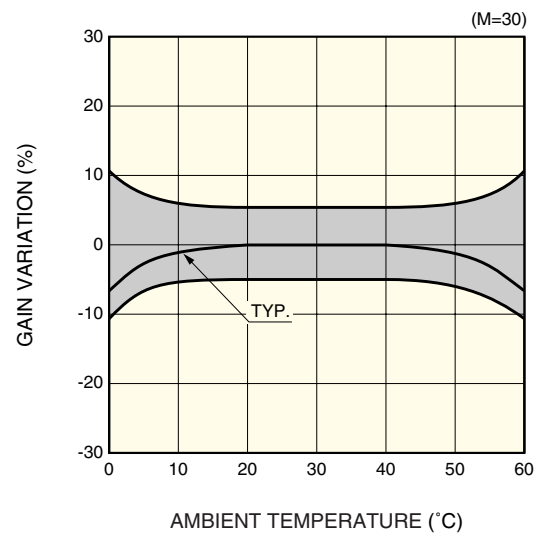
■ Spectral response



* Measured at a reverse voltage giving a gain of 30.
Incident light is 650 nm.

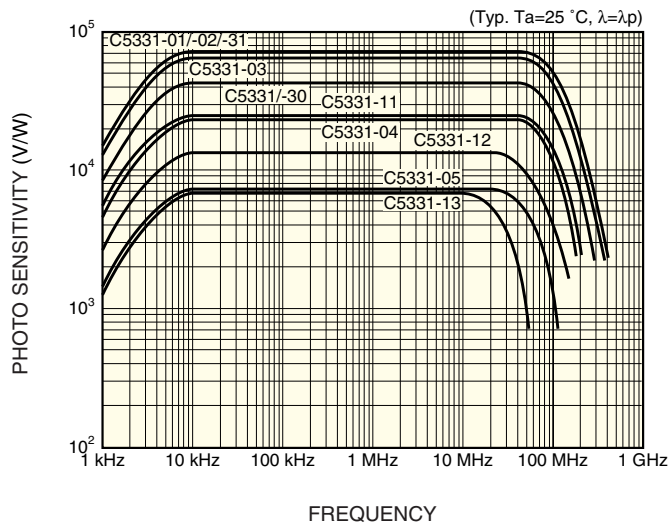
KAPDB0051EA

■ Gain temperature characteristic



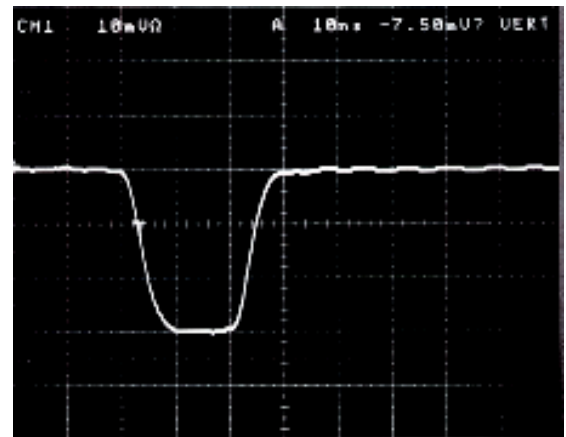
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■ Frequency response



KACCB0021EB

■ Response to stepped light input (C5331-03)



$T_a=25^\circ\text{C}$, gain $M=30$, input pulse width= $20\text{ }\mu\text{s}$
X-axis: 10 ns/div. , Y-axis: 10 mV/div.

