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APD module



C5658

Detects optical signals at 1 GHz, with high sensitivity

The APD module C5658 is a highly sensitive photodetector consisting of a Si APD (avalanche photodiode), a bias power supply and a low-noise amplifier, all integrated into a compact case. The APD used has an effective photosensitive area of ϕ0.5 mm to allow efficient coupling to a light beam in applications such as FSO (free space optics). The APD internally multiplies the photocurrent to produce an ample gain (set to 100 times for the C5658) and also features high-speed response, achieving detection limits up to 1 GHz wideband and -48 dBm (16 nW rms) noise level in combination with the low-noise amplifier. The C5658 also incorporates a thermosensor and a temperature-compensated bias power supply necessary for stable operation of the APD. Highly sensitive optical measurements can be made just by supplying +12 V to the C5658.

Features

- **High-speed response and high sensitivity**
- **Flat frequency characteristics**
- **Compact and lightweight**
- **Single power supply operation**

Applications

- **Laser radar**
- **FSO**
- **Optical rangefinder**

Absolute maximum ratings

Parameter	Condition	Value	Unit
Supply voltage		+13.5	V
Maximum incident light level	Continuous input	10	mW
Operating temperature		0 to +50	°C
Storage temperature		-20 to +70	°C

Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

Electrical and optical characteristics (Ta=25 °C, Vcc=12 V, output terminated with 50 Ω)

Parameter	Condition	Typ.	Unit
Spectral response range		400 to 1000	nm
Photosensitive area		ϕ0.5	mm
Quantum efficiency	λ=800 nm	70	%
Cutoff frequency (-3 dB)	High band	1	GHz
	Low band	50	kHz
Detection sensitivity	λ=800 nm	2.5×10^5	V/W
Gain stability	25 °C ± 10 °C	±5.0	%
Noise level	Dark state	-48	dBm
Output impedance		50	Ω
VSWR*		1.5	-
Compression point at 1 dB		3	μW

* VSWR (voltage standing wave ratio)
If internal matching of elements on a signal transmission line (matching between element input/output impedance and signal line impedance) is poor, signal reflections occur that generate standing waves on the signal line. The VSWR is the ratio of standing wave maximum amplitude (V max.) to minimum amplitude (V min.) and indicates how well the impedance is internally matched. When this internal matching is complete, no standing waves exit and the VSWR is 0 (zero).

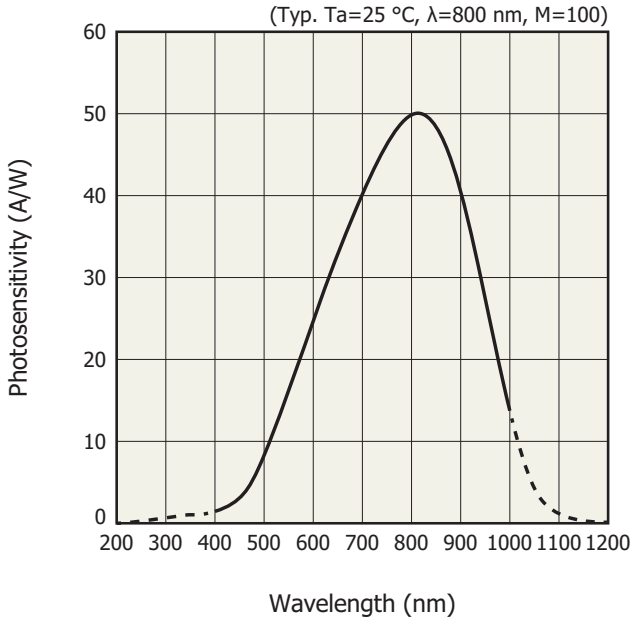
Signal connector

Parameter	Standard
Signal output	SMA
Power supply connector	D-sub 9-pin

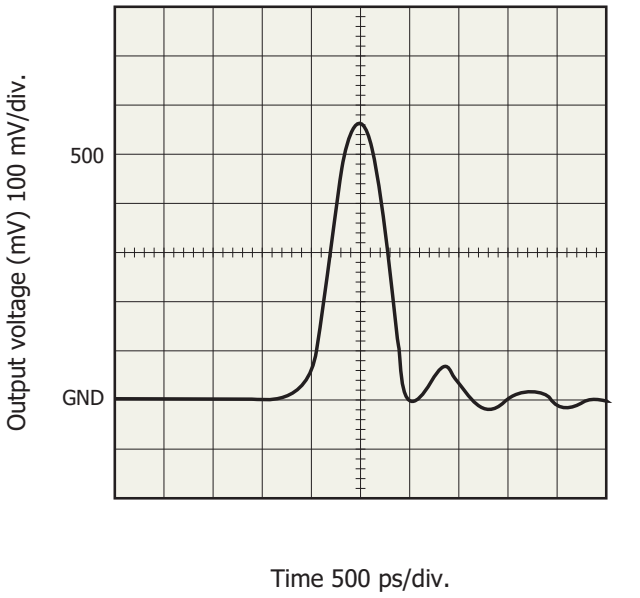
Structure

Parameter	Condition	Value	Unit
Supply voltage		+12 ± 0.1	V
Current consumption		100	mA
Dimensions	Excluding projecting parts	28 × 50 × 60	mm
Weight		120	g

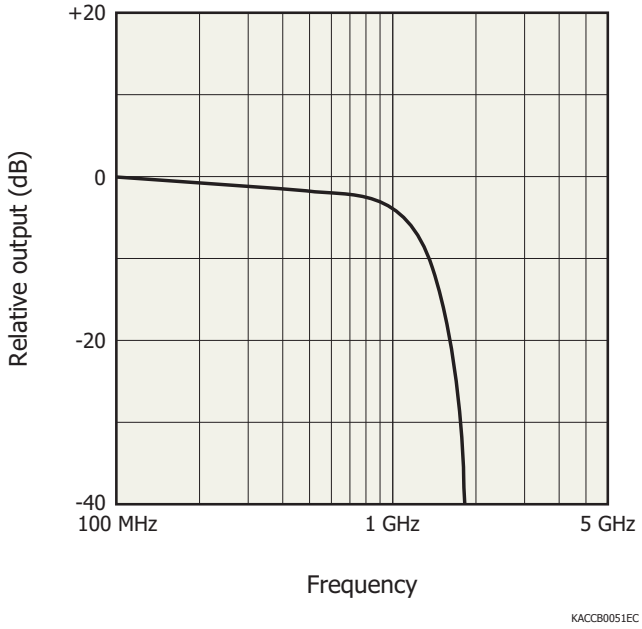
Spectral response



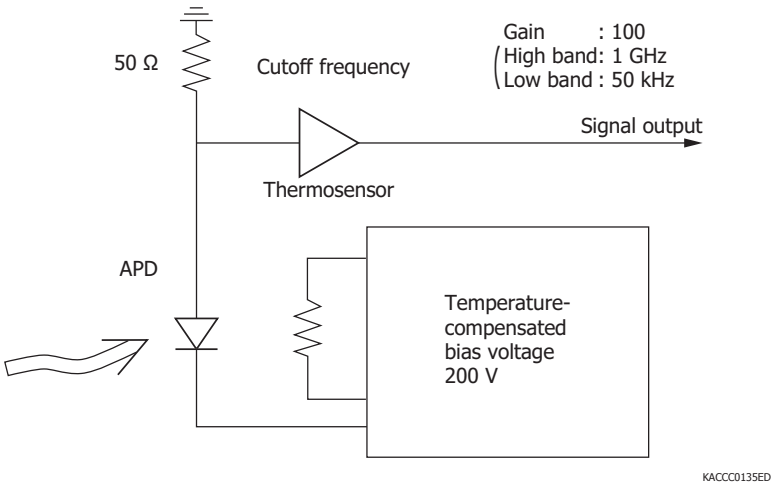
Pulse response waveform



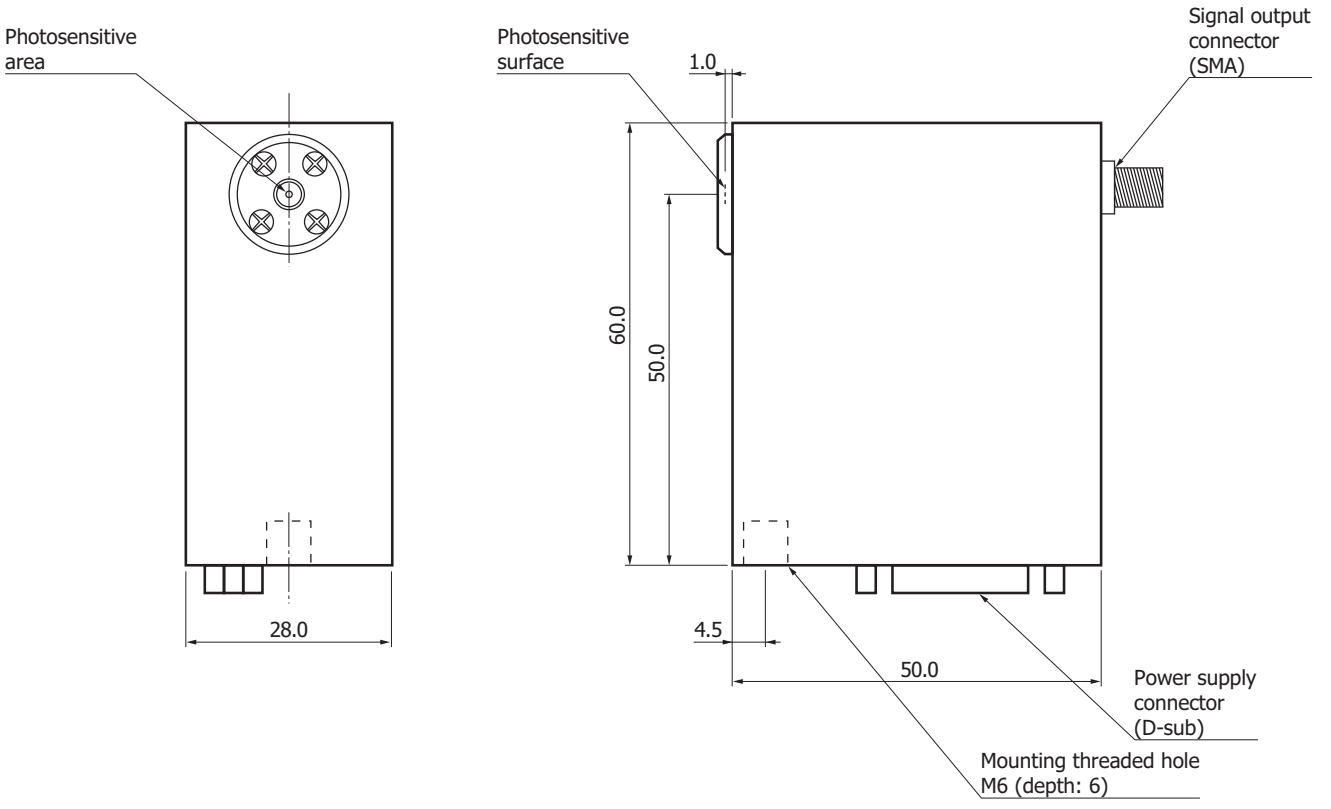
Frequency response



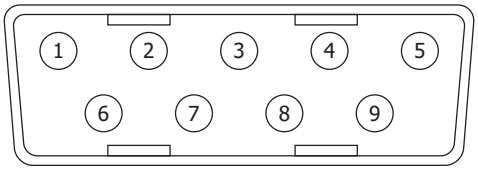
Block diagram



Dimensional outline (unit: mm)



Pin connections



Pin no.	Signal
1	+12 V
2	NC
3	GND
4	NC
5	NC
6	NC
7	NC
8	NC
9	NC

Mating connector (supplied): DE-9S (made by JAE) or equivalent

Accessories

· CD-ROM (Instruction Manual)
· D-sub connector

Related information

www.hamamatsu.com/sp/ssd/doc_en.html

■ Precautions

· Dislaimer

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