



G8931 series

High-speed response

The G8931 series are InGaAs APDs used for distance measurement, optical communication, and low-light-level detection. The G8931-04 provides high-speed response at 2.5 Gbps, which is necessary for SONET, G/GE-PON, and other optical trunk lines. The G8931-20 features a large $\phi 0.2$ mm photosensitive area.

Features

- High-speed response: 2.5 Gbps (G8931-04)
- Low dark current
- Low capacitance
- High sensitivity

Applications

- Distance measurement
- Optical communications
- Low-light-level detection

Structure

Parameter	Symbol	G8931-04	G8931-10	G8931-20	Unit
Photosensitive area	-	$\phi 0.04$	$\phi 0.1$	$\phi 0.2$	mm
Package	-	TO-18			-
Window material	-	Borosilicate glass (AR coated: 1.55 μm)			-

Absolute maximum ratings (Ta=25 °C)

Parameter	Symbol	G8931-04	G8931-10	G8931-20	Unit
Forward current	I_F	10			mA
Reverse current	I_R	2			mA
Operating temperature*1	T_{opr}	-40 to +85			°C
Storage temperature*1	T_{stg}	-55 to +125			°C

*1: No dew condensation

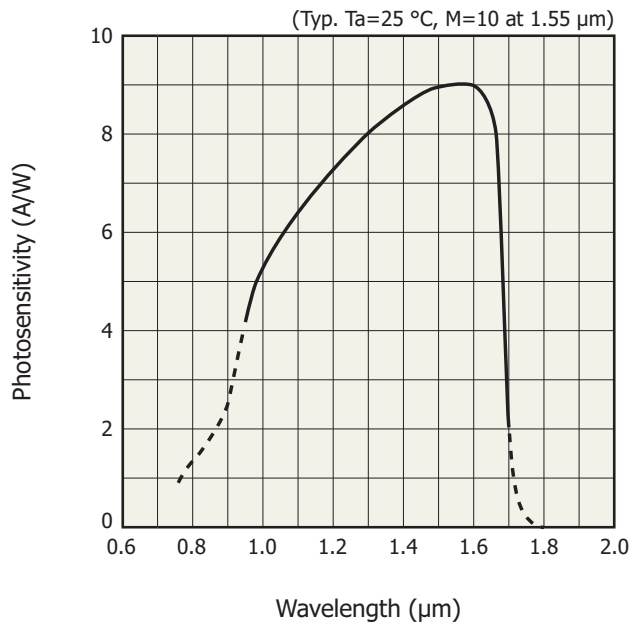
When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

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

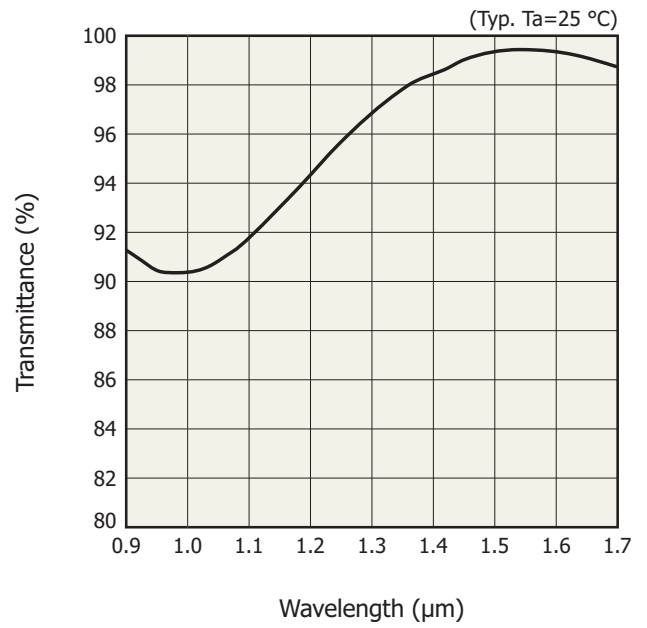
Electrical and optical characteristics (Ta=25 °C)

Parameter	Symbol	Condition	G8931-04			G8931-10			G8931-20			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range	λ		0.95 to 1.7			0.95 to 1.7			0.95 to 1.7			μm
Peak sensitivity wavelength	λ_p		-	1.55	-	-	1.55	-	-	1.55	-	μm
Photosensitivity	S	$\lambda=1.55 \mu\text{m}, M=1$	0.8	0.9	-	0.8	0.9	-	0.8	0.9	-	A/W
Dark current	I_D	$V_R=V_{BR} \times 0.9$	-	40	65	-	90	140	-	150	200	nA
Temperature coefficient of dark current	ΔT_{ID}	$V_R=V_{BR} \times 0.9$	-	1.07	-	-	1.07	-	-	1.07	-	times/°C
Cutoff frequency	f_c	$M=10$	3	4	-	0.8	1.5	-	0.6	0.9	-	GHz
Terminal capacitance	C_t	$V_R=V_{BR} \times 0.9$	-	0.35	0.45	-	0.7	1	-	1.5	2	pF
Breakdown voltage	V_{BR}	$I_D=100 \mu\text{A}$	40	55	60	40	55	60	40	55	60	V
Temperature coefficient of breakdown voltage	Γ	-40 to +85 °C	-	0.11	-	-	0.11	-	-	0.11	-	V/°C
Excess noise figure	F	$I_{po}=3 \mu\text{A}, M=10$ to 20	-	0.7	0.85	-	0.7	0.85	-	0.7	0.85	-
Gain	M	$\lambda=1.55 \mu\text{m}, I_{po}=1 \mu\text{A}$	20	30	-	20	30	-	20	30	-	-

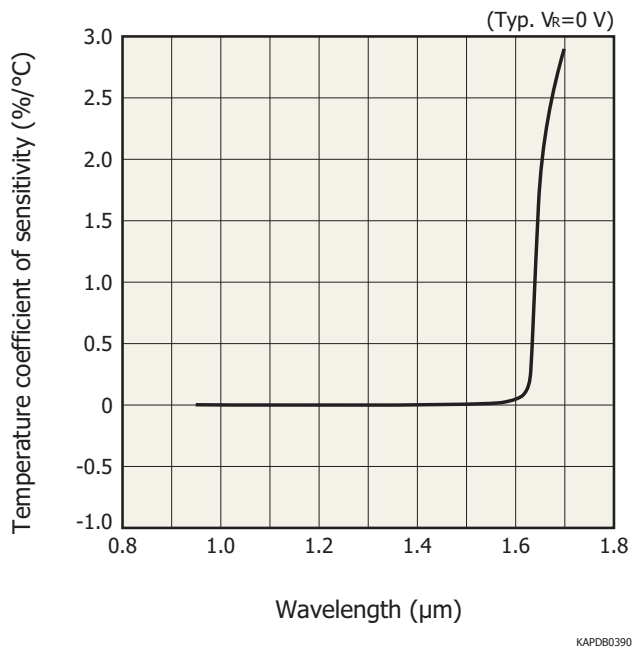
Spectral response



Spectral transmittance of window material

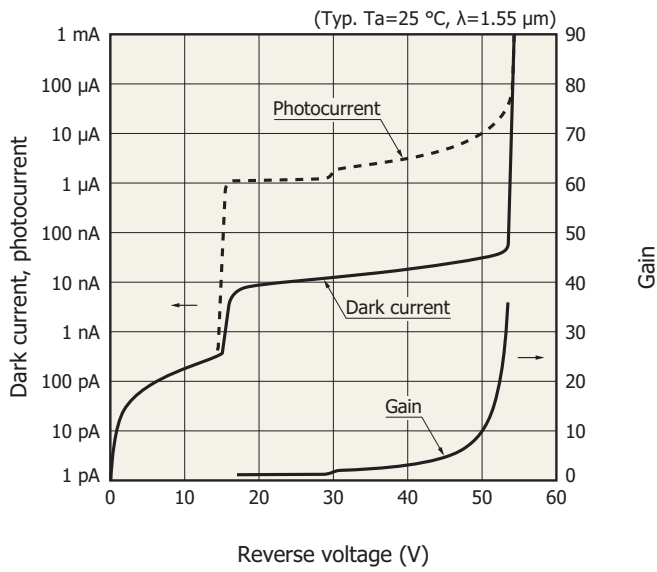


Photosensitivity temperature characteristics



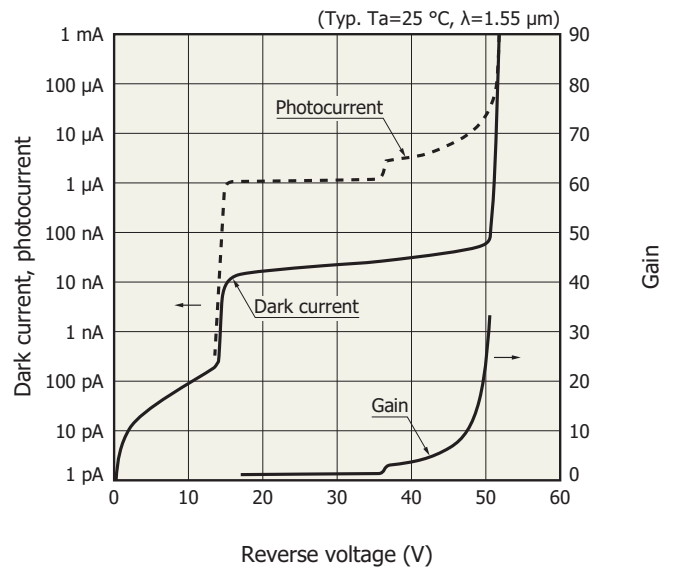
Dark current, photocurrent, gain vs. reverse voltage

G8931-04



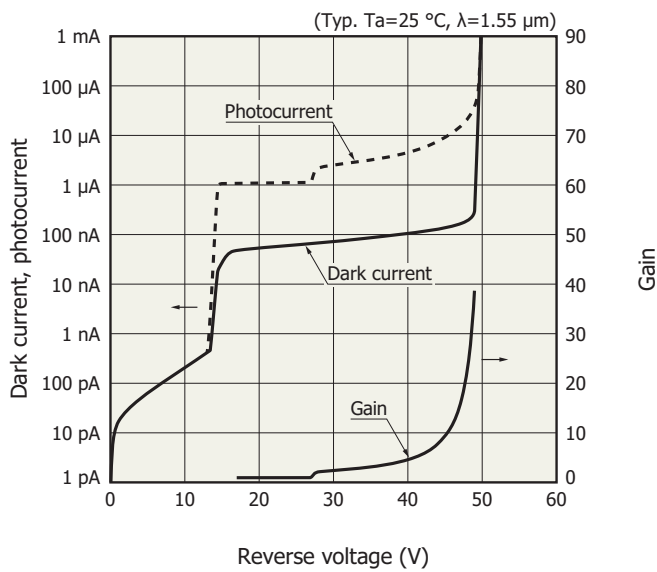
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G8931-10



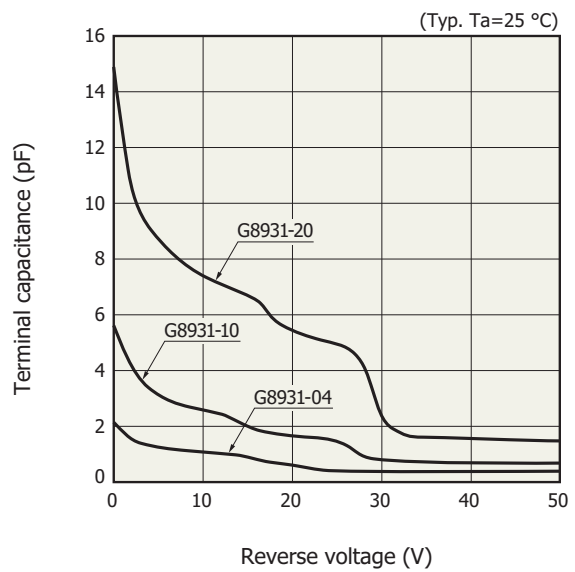
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G8931-20



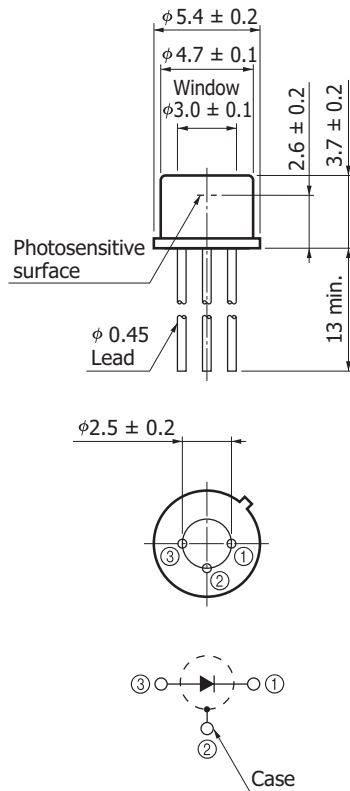
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Terminal capacitance vs. reverse voltage



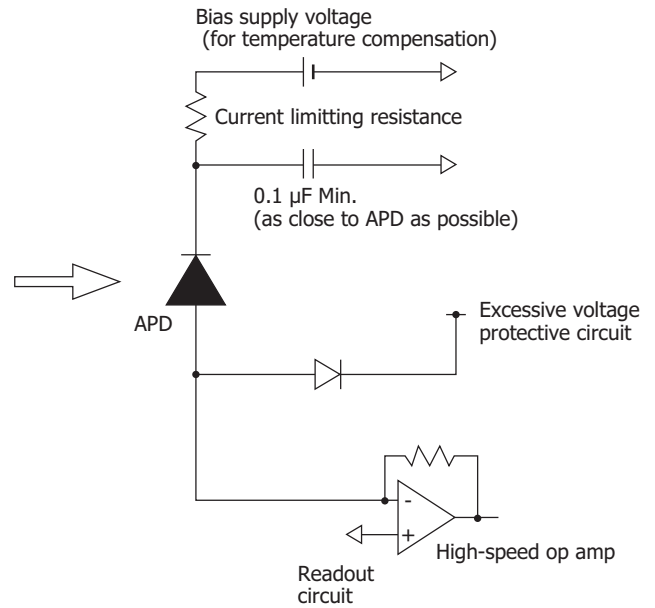
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Dimensional outline (unit: mm)



KAPDA0034EA

APD peripheral circuit example



KAPDC0005EC

Related information

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

Precautions

- Disclaimer
- Safety precautions
- Metal, ceramic, plastic packages
- Compound semiconductor photosensors

Technical information

- Infrared detectors

The content of this document is current as of September 2017.

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