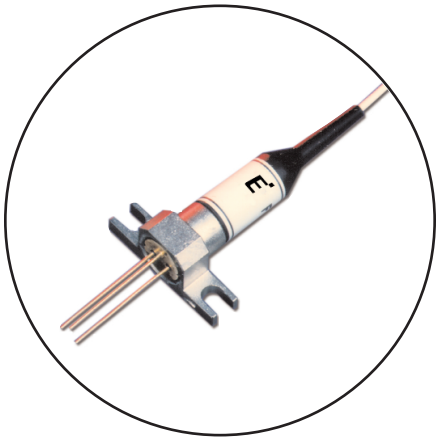
Avalanche Photodiode — FPD5W1KX

FEATURES

- Data rates up to 2.5Gb/s
- Operating temperature: -40°c to 85°C
- Photosensitive diameter: 30µm
- High cut-off frequency: 3.0GHz at M=5 and 10
- Large gain-bandwidth product: 40GHz
- Low dark current: 20nA
- Low multipled dark current: 3nA
- Low excess noise factor: 5 at M=10



APPLICATIONS

- 2.4 Gb/s optical transmission systems

DESCRIPTION

The FPD5W1KX is a wide bandwidth, high sensitivity avalanche photodiode (APD) optimized for operation at 1550nm. This APD is designed for use in optical transmission systems operating at a giga-bit-rate, above 2.4Gb/s, and for long transmission distances. The APD chip has a photosensitive area diameter of 30µm. Fujitsu's advanced InP material technology realizes a high reliability planar structure device with wide bandwidth (large gain-bandwidth product) as well as low noise characteristics. A single-mode fiber is aligned to a hermetically sealed APD through a highly stable optical coupling system.

ABSOLUTE MAXIMUM RATINGS (T_a=25°C, unless otherwise specified)

Parameter	Symbol	Ratings		Unit
		Min.	Max.	
Storage Temperature	T_{stg}	-40	+85	°C
Operating Temperature	T_{op}	-40	+85	°C
APD Reverse Current	I_R	0	3(peak)	mA
APD Forward Current	I_F	-	10	mA
APD Reverse Voltage	V_R	-	VB	V

Note: Since VB may vary from device-to-device, VB data is attached to each device for reference.

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Eudyna

OPTICAL & ELECTRICAL CHARACTERISTICS
(T_a=-40°C to +85°C, λ=1,310/1,550nm, unless otherwise specified)

Parameter	Symbol	Test Conditions		Limits Min.	Limits Typ.	Limits Max.	Unit
APD Responsivity	R	λ = 1,310nm, M=1, 25°C		0.8	0.85	-	A/W
		λ = 1,550nm, M=1, 25°C		0.8	0.92	-	
		λ = 1,310/1,550nm, M=1, -40 ~ +85°C		0.75	-	-	
		λ = 1,610nm, M=1, 25°C		-	0.7	-	
APD Breakdown Voltage	VB	ID = 10μA, 25°C		40	50	60	V
Temperature Coefficient of VB	Γ	Note (1)		0.08	0.12	0.15	V/°C
Dark Current	ID	VR=0.9 x VB	25°C	-	15	40	nA
			70°C	-	-	800	
			85°C	-	-	1700	
Mulitiplied Dark Current	IDM	M=1	25°C	-	1.5	10	nA
			70°C	-	-	160	
			85°C	-	-	340	
Excess Noise Factor	F (x)	M=10, f=30MHz, B=1MHz, Ipo=2μA		- -	4 (0.6)	6.3 (0.8)	
Cut-off Frequency	fc	RL=50Ω, -3dB from 500kHz	M=3	2.0	3.0	-	GHz
			M=5, 10	2.5	3.0	-	GHz
			M=20	1.5	3.0	-	GHz
Capacitance	Ct	f=1MHz, VR=0.9 X VB		-	0.55	0.7	pF
Optical Return Loss	ORL	-		30	-	-	dB
Maximum Multiplication Factor	Mmax	Ipo=2μA		30	40	-	

Note 1: Γ=ΔVB/dTc

Fig. 1 Responsivity vs. Wavelength

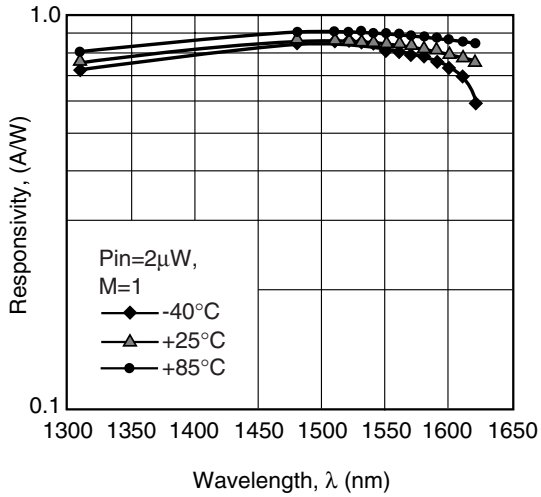


Fig. 2 Responsivity vs. Temperature

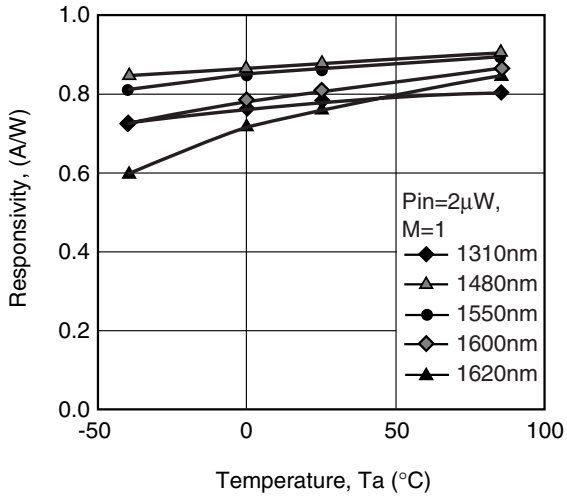


Fig. 3 Dark Current vs. Reverse Voltage

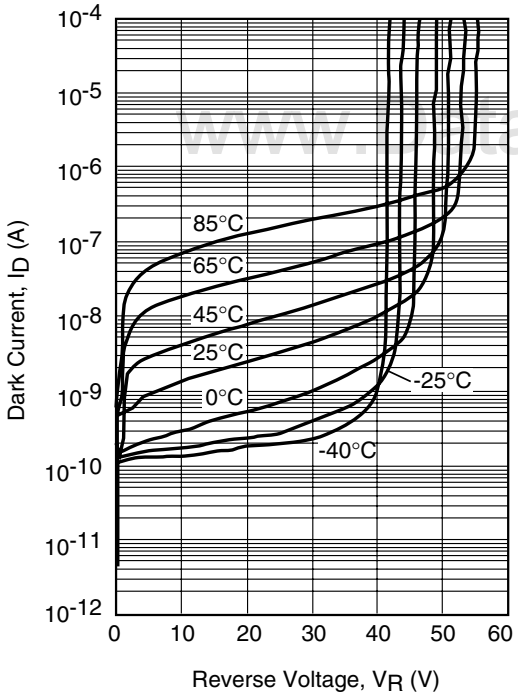


Fig. 5 Multiplication Characteristics

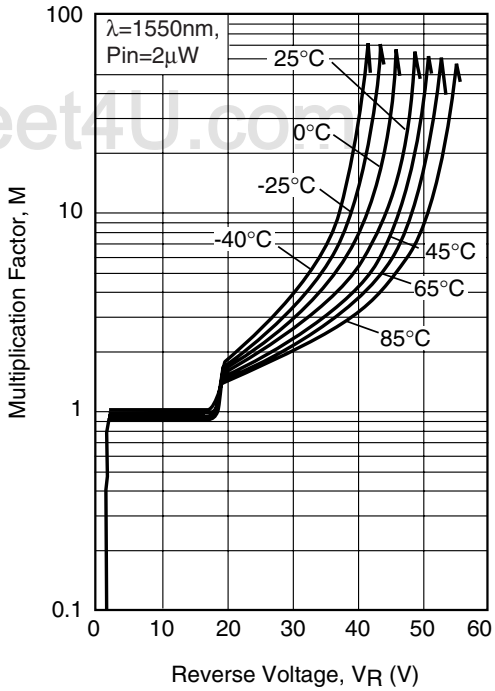


Fig. 6 Multiplication Factor vs. Photocurrent

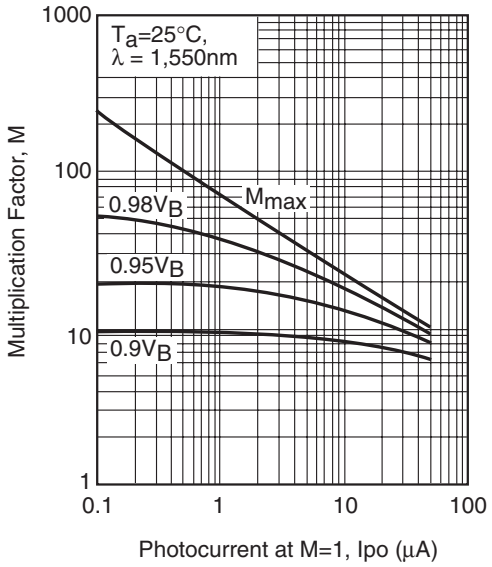


Fig. 7A Frequency Response
(Air Gap ~ 2mm)

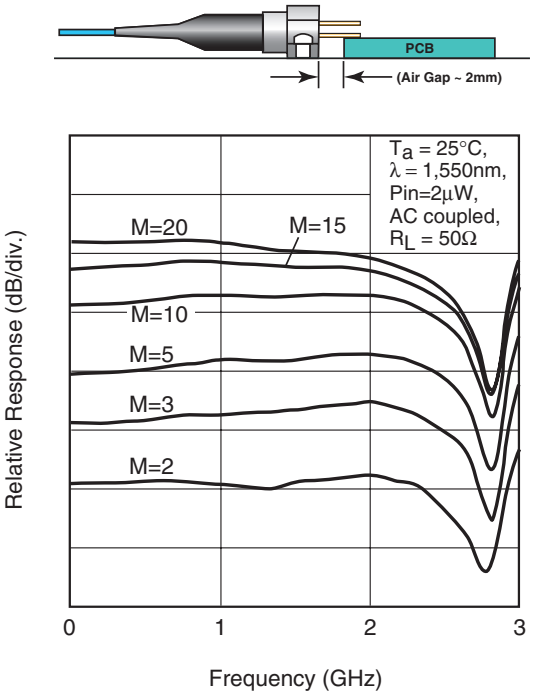


Fig. 7B Frequency Response
(Air Gap ~ 0mm)

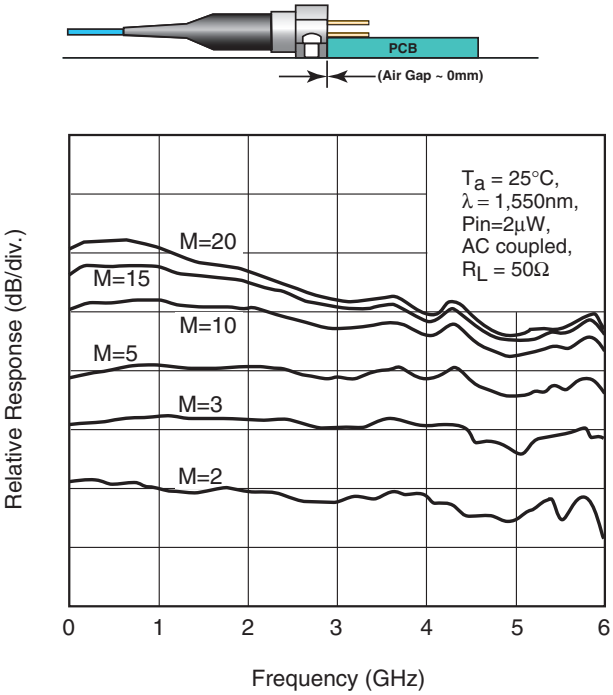


Fig. 8 Cutoff Frequency vs. Multiplication Factor

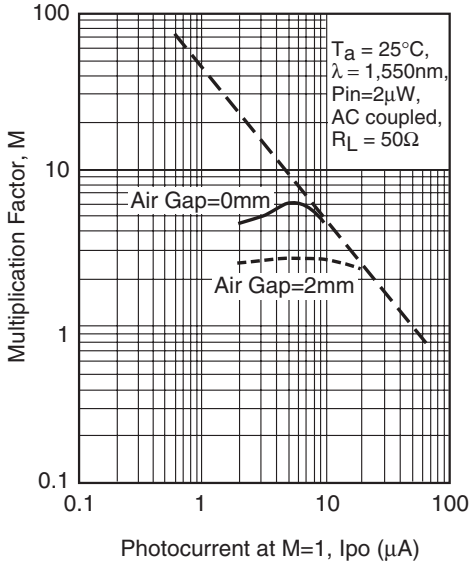


Fig. 9 Temperature Coefficient vs. Breakdown Voltage

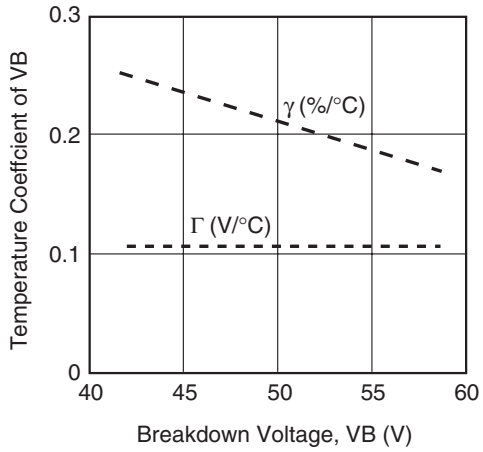


Fig. 10 Excess Noise Factor vs. Multiplication Factor

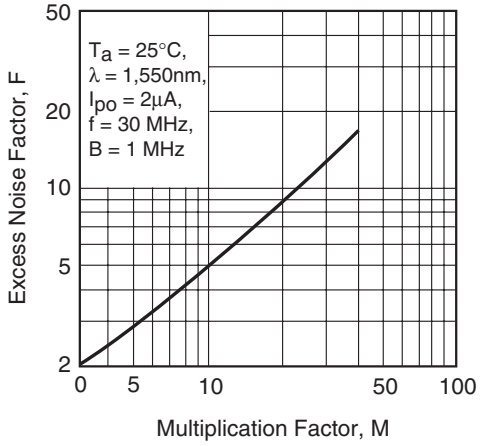
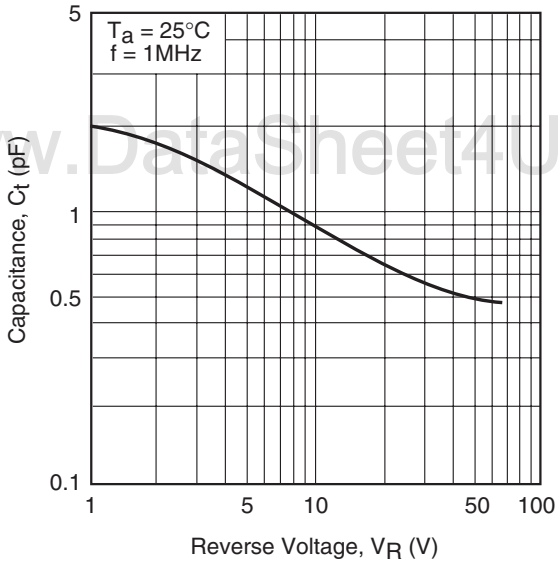
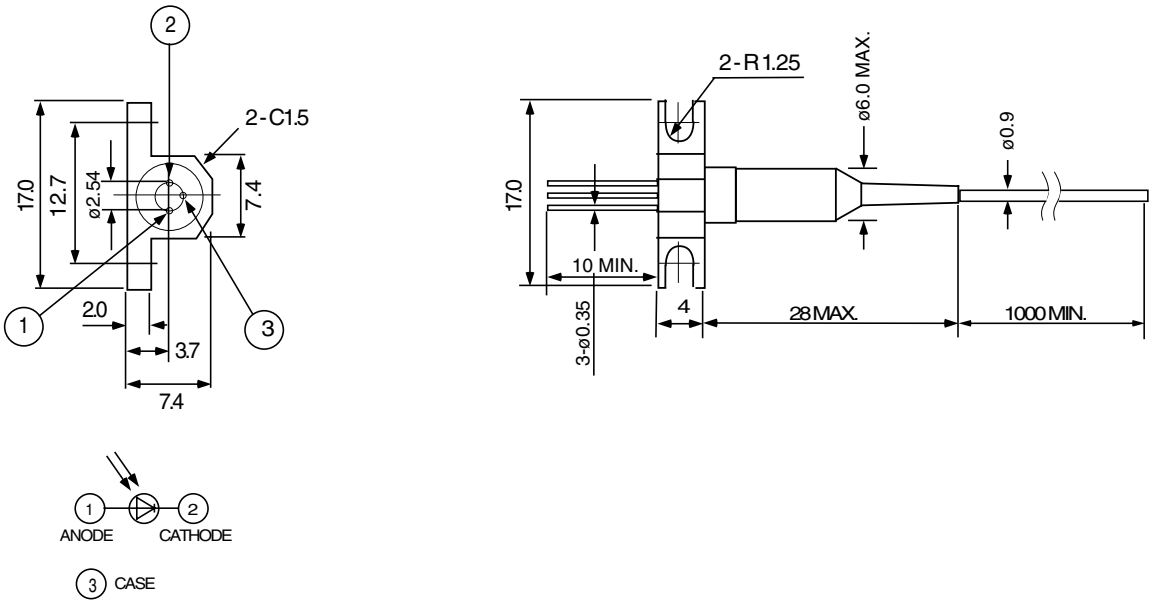


Fig. 11 Capacitance vs. Reverse Voltage



"KX" PACKAGE **UNIT: mm**



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CAUTION

Eudyna Devices Inc. products contain **gallium arsenide (GaAs)** which can be hazardous to the human body and the environment. For safety, observe the following procedures:

- **Do not put this product into the mouth.**
- **Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.**
- **Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.**