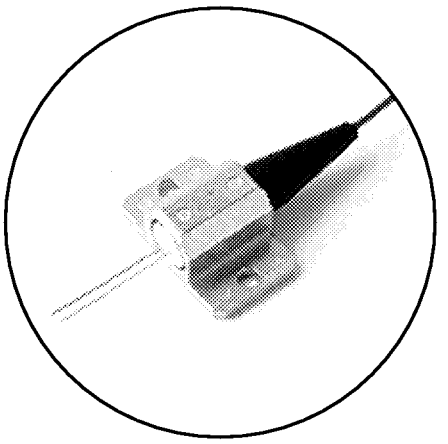
InGaAs Avalanche Photodiode — *FPD5W1KS*

FEATURES

- Multi-mode fiber pigtail
- 30dB Optical Return Loss (ORL)
- 30 µm active area APD
- High reliability planar structure with a guard ring based on advanced InGaAs/InP material technology
- High cut-off frequency (2.5GHz)
- Low dark current
- Low multiplied dark current
- Low excess noise factor



APPLICATIONS

- 2.4 Gb/s optical transmission systems

DESCRIPTION

The FPD5W1KS is a wide bandwidth, high sensitivity InGaAs 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 InGaAs/InP material technology realizes a high reliability planar structure device with wide bandwidth (large gain-bandwidth product) as well as low noise characteristics. A multi-mode fiber is aligned to a hermetically sealed APD through a highly stable optical coupling system.

Edition 1.0
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FUJITSU

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Parameter	Symbol	Ratings	Unit
Storage Temperature	T_{stg}	-40 to +85	°C
Operating Case Temperature	T_{op}	-40 to +85	°C
Forward Current	I_F	10	mA
Reverse Current	I_R	1.0	mA

OPTICAL & ELECTRICAL CHARACTERISTICS (T_a=25°C)

Parameter	Symbol	Limits		Unit	Conditions	
		Min.	Max.			
Responsivity	R	0.88	-	A/W	λ=1,550nm	M=1
		0.73	-	A/W	λ=1,310nm	
Temperature Dependence of Responsivity	-	-3	+3	%	Ta=-20 to +70°C	λ=1,310nm, 1,550nm
		-4	+4		Ta=-40 to +85°C	
Breakdown Voltage	VB	45	65	V	ID=10μA	
Temperature Coefficient of Breakdown Voltage	γ	0.09	0.15	V/°C	$\gamma = \frac{\Delta VB}{\Delta T}$	
Dark Current	I_D1	-	50	nA	Ta=25°C	V_R=0.9VB
	I_D2	-	0.8	μA	Ta=70°C	
	I_D3	-	1.7	μA	Ta=85°C	
Multiplied Dark Current	I_{DM1}	-	10	nA	Ta=25°C	M=1
	I_{DM2}	-	160	nA	Ta=70°C	
	I_{DM3}	-	340	nA	Ta=85°C	
Excess Noise Factor	F	-	6.3	-	λ=1,310, 1,550nm, M=10, f=30 MHz B=1 MHz, Ipo=2μA	
Cutoff Frequency	fc	2.5	-	GHz	M=5	λ=1,310, 1,550nm R_L=50Ω -3dB from 500KHZ
		2.5	-		M=10	
		1.5	-		M=20	
Capacitance	C_t	-	0.6	pF	f=1MHz, V_R=0.9V_B	
Maximum Multiplication Factor	M_{max}	30	-	-	λ=1,310, 1,550nm, Ipo=2μA	
Optical Return Loss	ORL	30	-	dB	λ=1,310, 1,550nm	

Note: Optical characteristics are specified on the condition that single mode fiber is used as the optical source for testing.

Fig. 1 Spectral Response (η vs. λ)

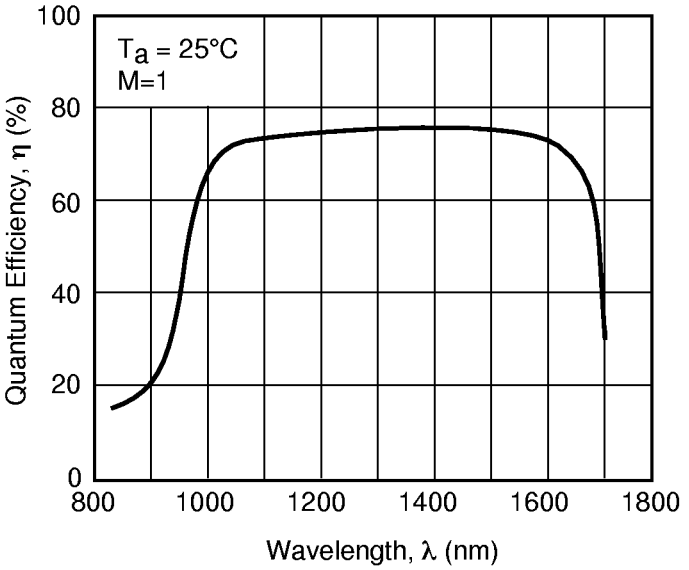


Fig. 2 Spectral Response (R vs.λ)

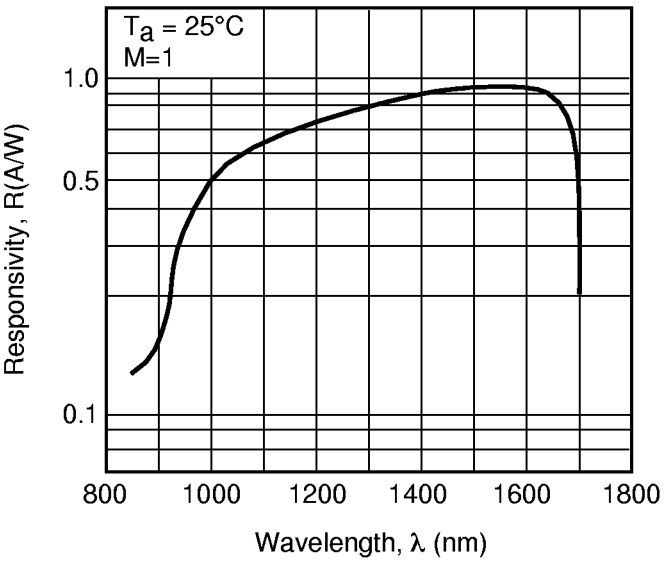


Fig. 3 Temperature Dependence of Responsivity

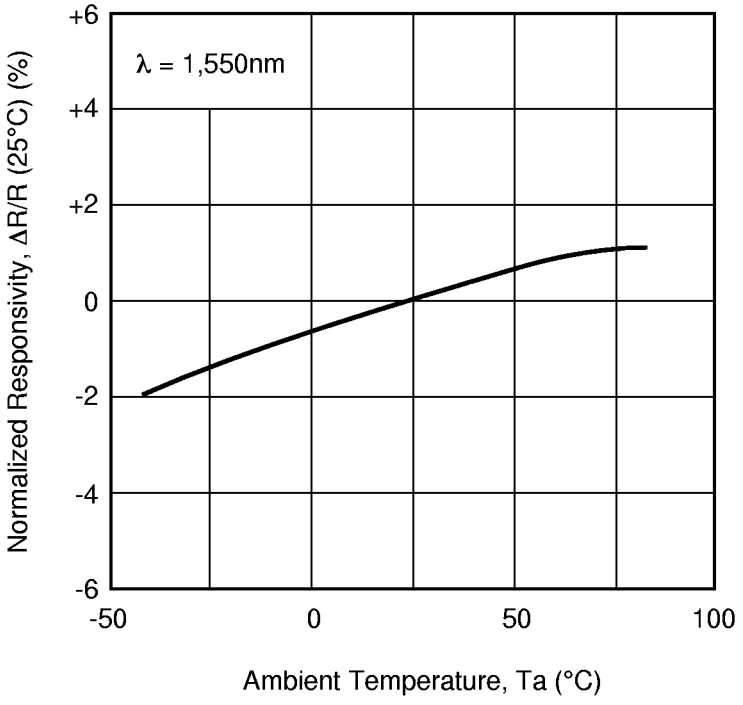


Fig. 4 Dark Current vs. Reverse Voltage

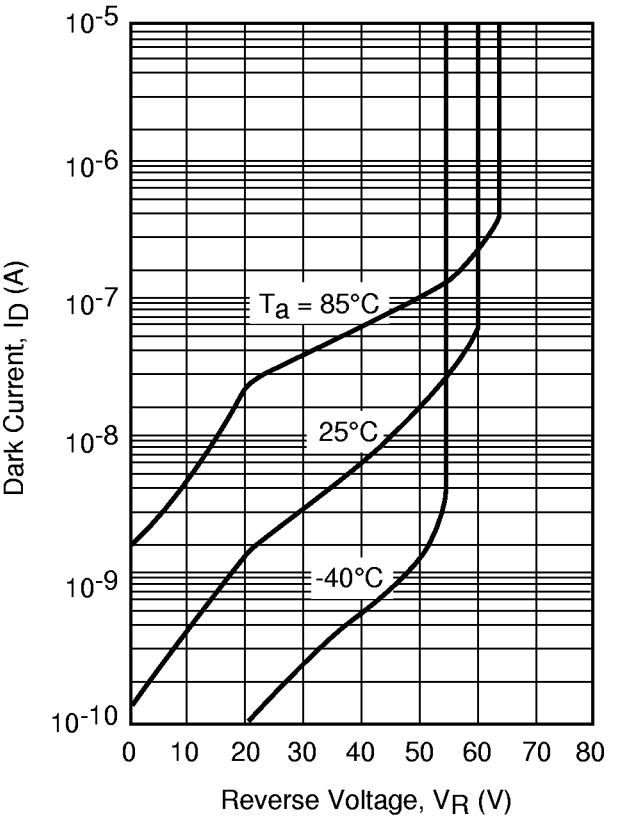


Fig. 5 Temperature Dependence of Dark Current and Multiplied Dark Current

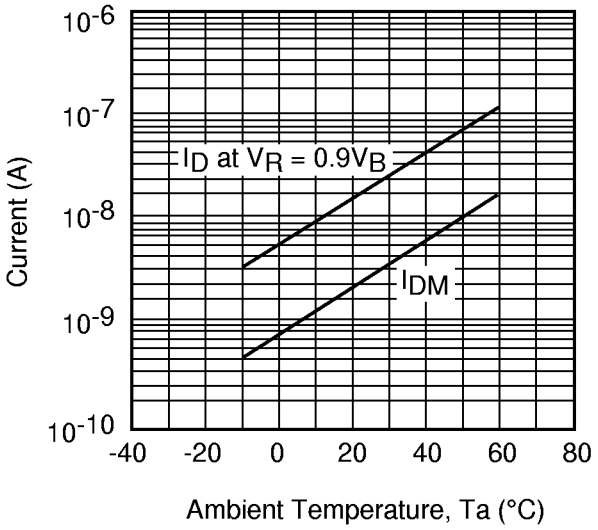


Fig. 6 Multiplication Characteristics

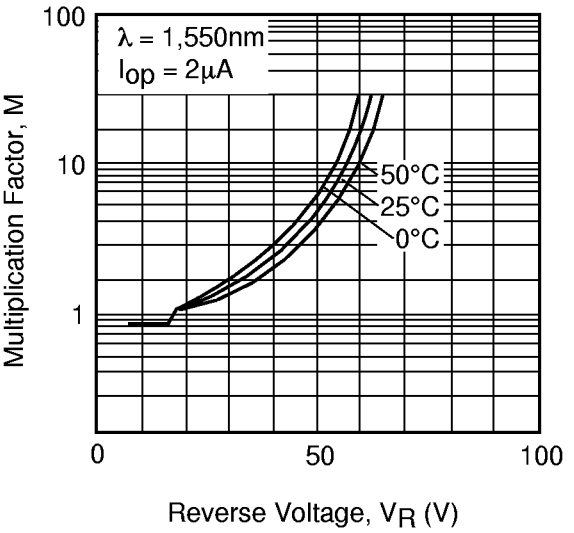


Fig. 7 Multiplication Factor vs. Photocurrent

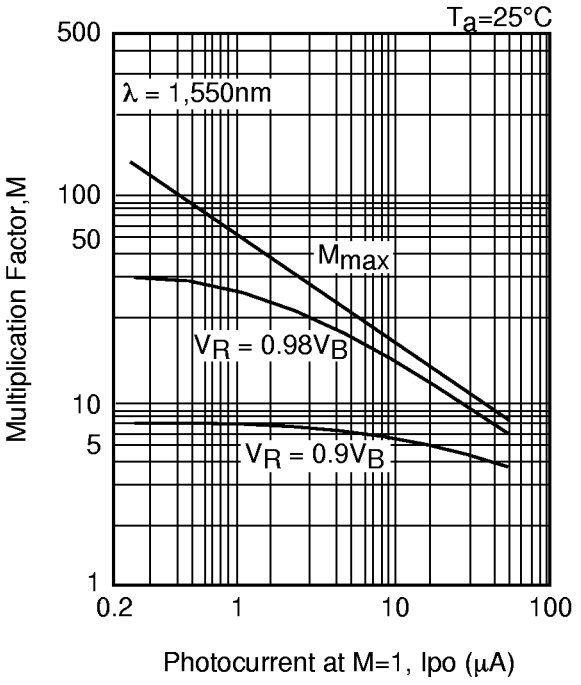


Fig. 8 Frequency Response

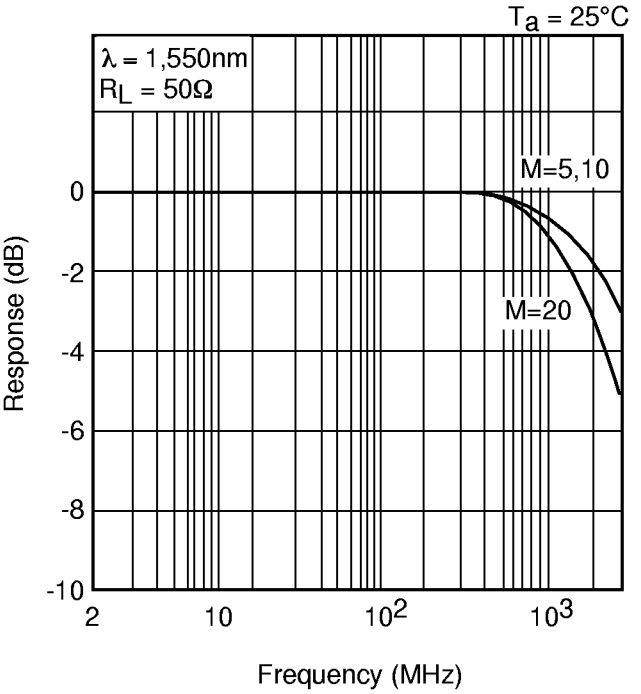


Fig. 9 Cutoff Frequency vs. Multiplication Factor

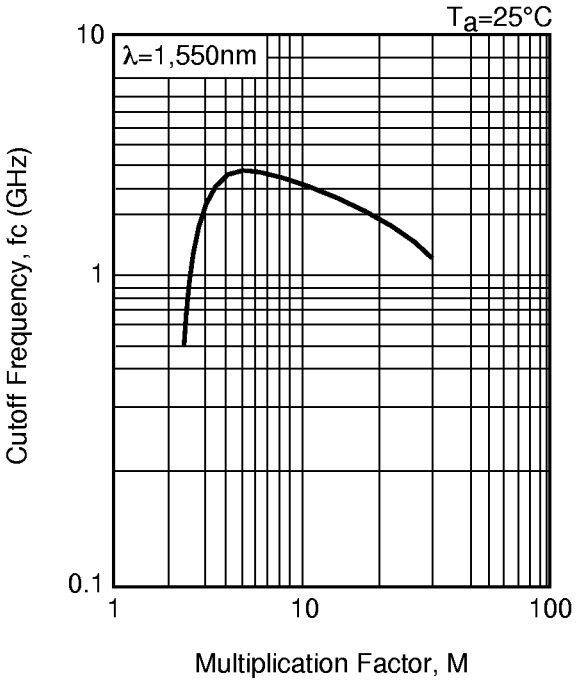


Fig. 10 Excess Noise Factor vs. Multiplication

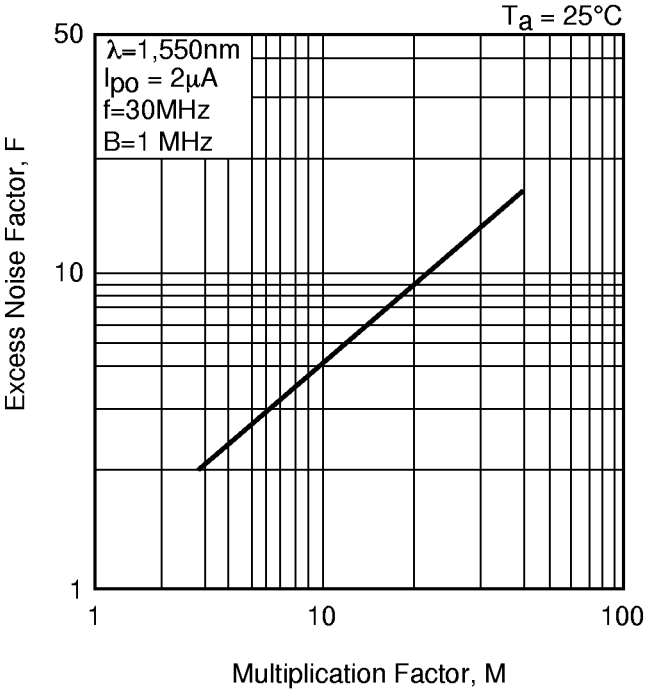
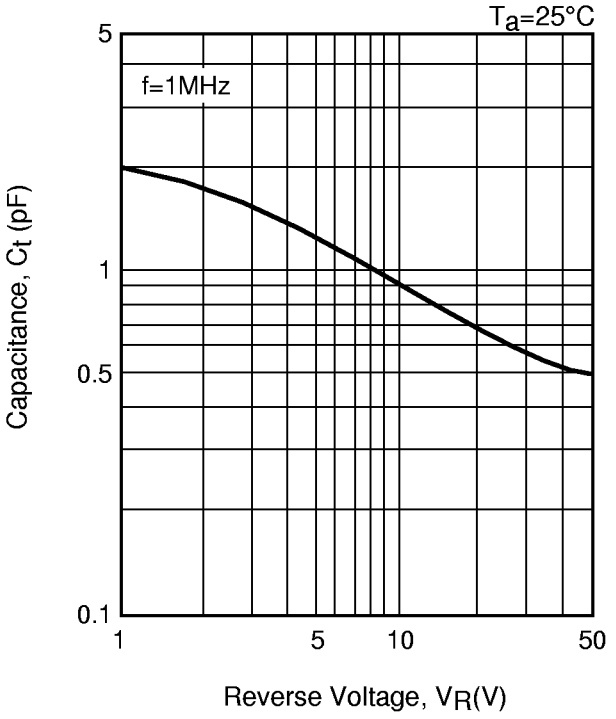
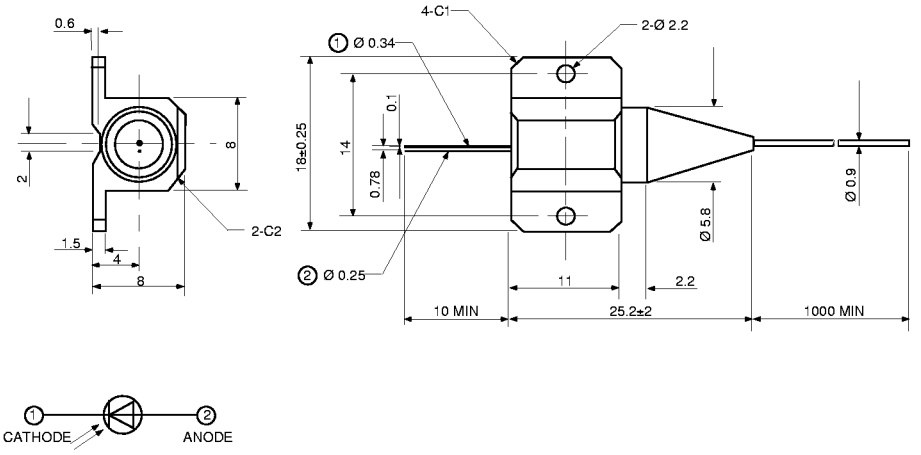


Fig. 11 Capacitance vs. Reverse Voltage



"KS" PACKAGE **UNIT: mm**



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- **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.**