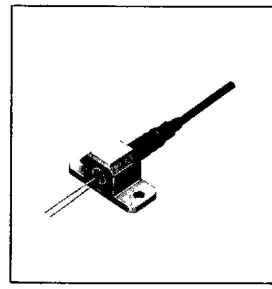
FPD13W51JW

InGaAs AVALANCHE PHOTODIODE

DESCRIPTION

The FPD13W51JW is a wide bandwidth and high sensitivity InGaAs avalanche photodiode (APD) with a multimode fiber pigtail designed for use in optical transmission systems operating at a giga-bit-rate, especially at 2.4Gb/s, and a long distance. The APD chip has a photosensitive area diameter of 50μm. 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 lens and the optical alignment system has a high coupling stability. The device is designated by the specified wavelength of 1300nm.



FEATURES

- Multi-mode fiber pigtail: GI 50/125 (core diameter 50±3μm, clading diameter 125±3μm)
- Photosensitive diameter: 50μm
- High cut-off frequency: 3.0GHz at M=5 and 10
- Large gain-bandwidth product: 40GHz
- Low dark current: 20nA
- Low multiplied dark current: 3nA
- Low excess noise factor: 5 at M=10
- High reliability planar structure with a guard ring based on advanced InGaAs/InP material technology.

APPLICATIONS

- 2.4Gb/s. optical transmission system.

ABSOLUTE MAXIMUM RATINGS (T_a = 25°C)

Parameter	Symbol	Ratings	Unit
Storage Temperature	T_{stg}	-20 to +70	°C
Operating Temperature	T_{op}	-10 to +60	°C
Forward Current	I_F	10	mA
Reverse Current	I_R	0.5	mA

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_a = 25°C)

Parameter	Symbol	Test Conditions		Limits Min.	Typ.	Max.	Unit
Quantum Efficiency (Responsivity)	η (R)	λ = 1300nm M = 1		65 (0.68)	70 (0.78)	–	% (A/W)
Breakdown Voltage	V_B	I_D = 10μA		60	80	100	V
Temperature Coefficient of V_B	γ			–	0.15	–	%/°C
Dark Current	I_D	V_R = 0.9V_B		–	20	50	nA
Multiplied Dark Current	I_{DM}	M = 1		–	3	10	nA
Excess Noise Factor	F	λ = 1300nm, M = 10 f=30MHz, B=1MHz I_{po} = 2μA		–	5	6.3	–
	X			–	0.7	0.8	–
Cut-off Frequency	f_c	λ=1300nm, R_L=50Ω, -3dB from 500KHz	M=5	2.5	3.0	–	GHz
			M=10	2.5	3.0	–	
			M=20	1.5	2.0	–	
Capacitance	C_t	f=1MHz, V_R=0.9V_B		–	0.7	0.8	pF
Max. Multiplication Factor	M_{max}	λ=1300nm, I_{po}=2μA		30	40	–	–

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TYPICAL CHARACTERISTICS

Fig. 1 Spectral Response (η vs. λ)

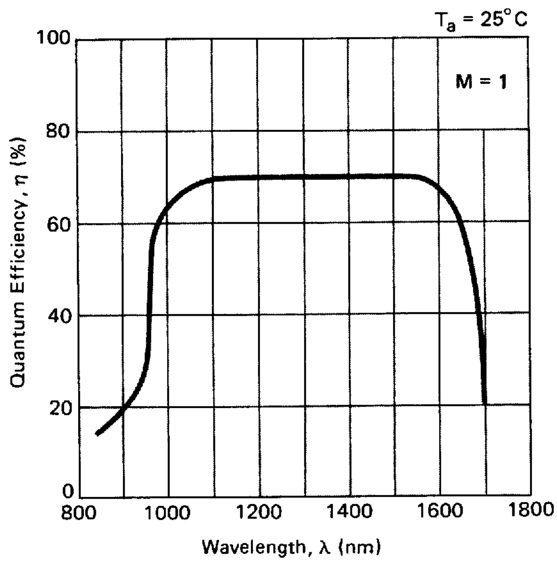

Fig. 2 Spectral Response (R vs. λ)

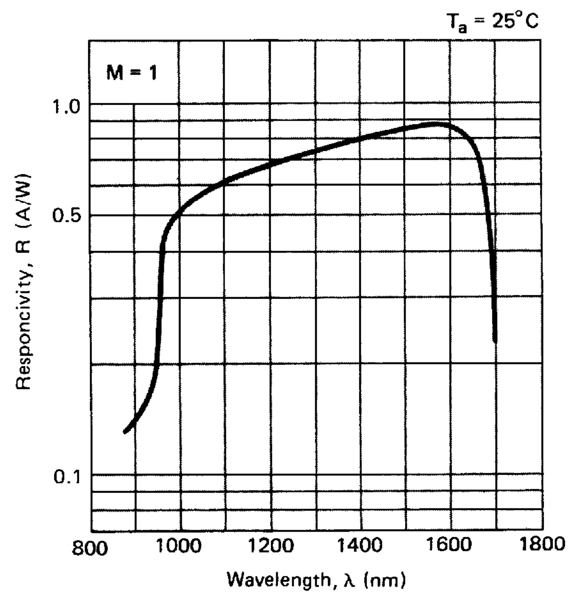

Fig. 3 Temperature Dependence of Responsivity

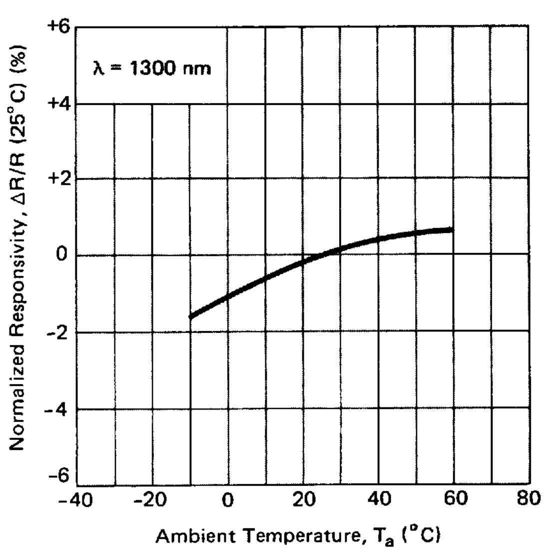

Fig. 4 Dark current vs. Reverse Voltage

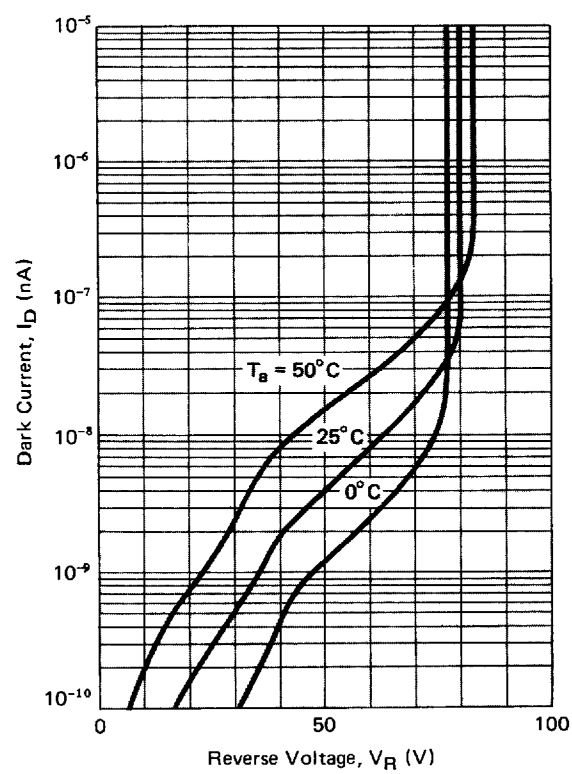

Fig. 5 Temperature Dependence of Dark Current and Multiplied Dark Current

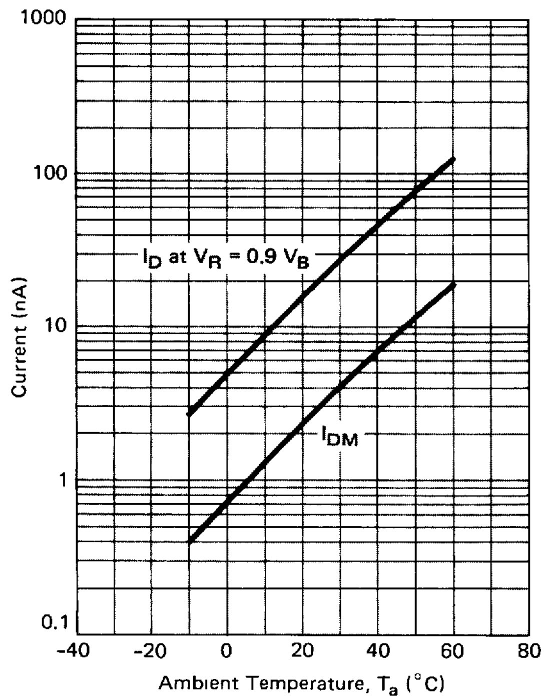

Fig. 6 Multiplication Characteristics

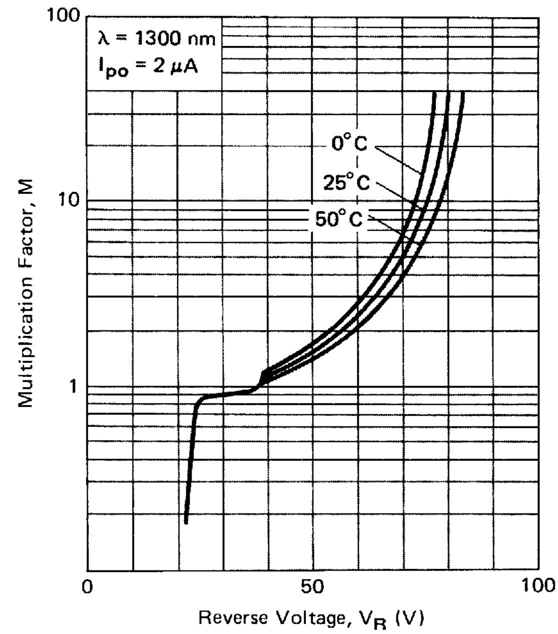

Fig. 7 Multiplication Factor vs. Photocurrent

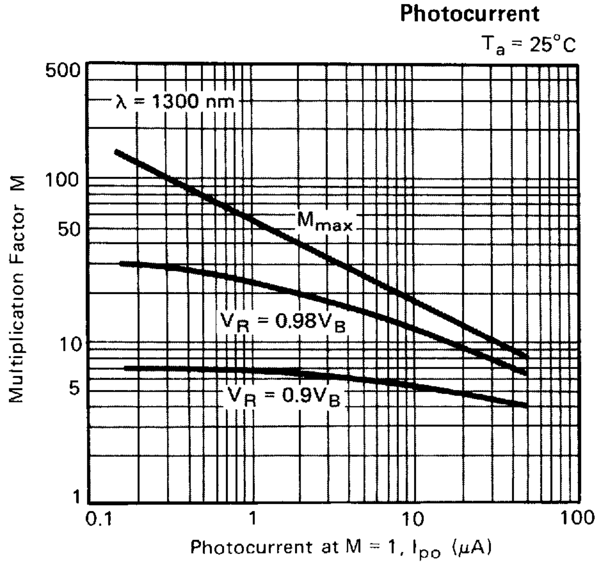

Fig. 8 Frequency Response Characteristics

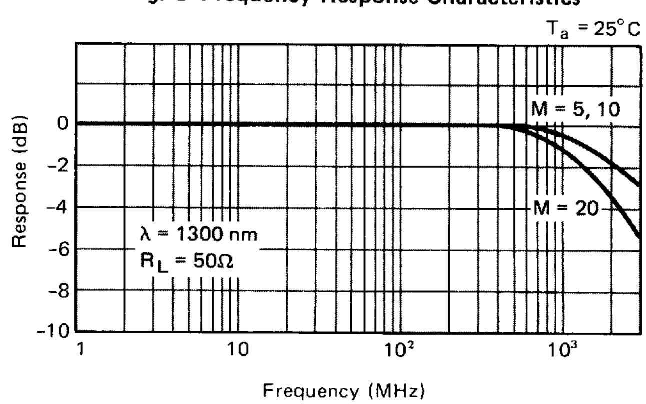

Fig. 9 Cutoff Frequency vs. Multiplication Factor

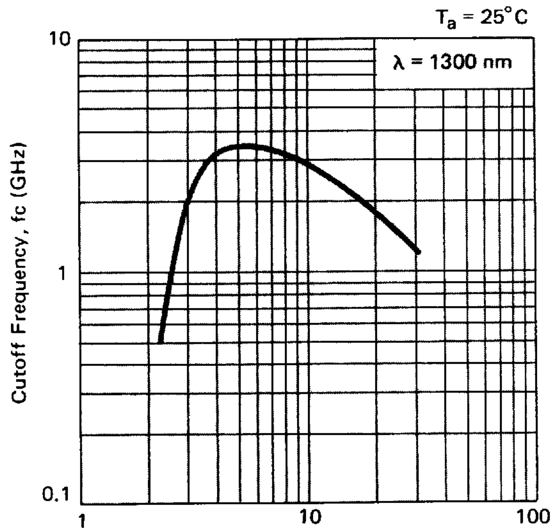

Fig. 10 Excess Noise Factor vs. Multiplication Factor

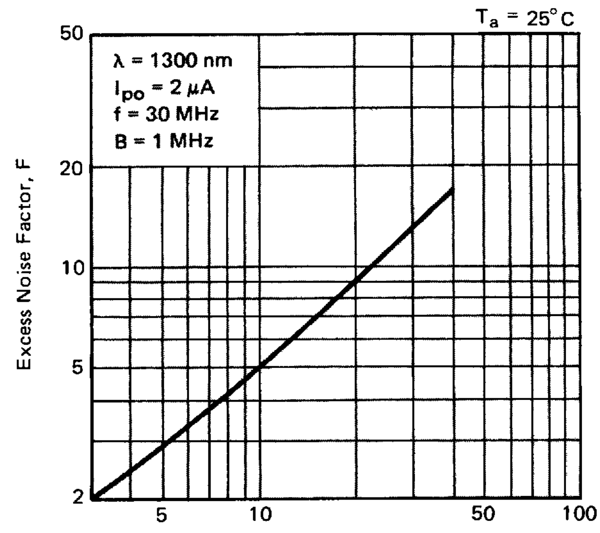

Fig. 11 Capacitance vs. Reverse Voltage