

FPD15U51KS

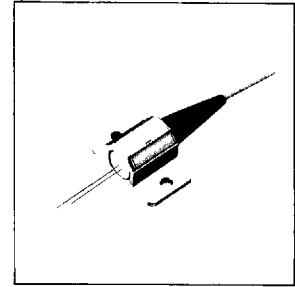
DESCRIPTION

The FPD15U51KS is an InGaAs Avalanche Photodiode (APD) with a multi-mode fiber pigtail designed for use in 1550nm wavelength optical transmission systems operating at high-bit-rates and over long distances.

Fujitsu's advanced InGaAs/InP material technology realizes a high reliability planar structure device with low dark current, low excess noise, and high quantum efficiency.

A laser welding assembly process assures long term stability of fiber coupling and a -40 to 85°C operating temperature range.

The KS package contains a hermetically sealed APD with lens coupled to a graded index 50/125 micron diameter multimode fiber.



FEATURES

- Meeting to an extended environmental conditions,
- Storage and operating temperature: -40 to $+85^{\circ}\text{C}$
- G150/125 multimode fiber pigtail coupled with a $50\mu\text{m}$ diam. InGaAs APD.
- High quantum efficiency: 75% at $1.55\mu\text{m}$
- Cutoff frequency: 1.5 GHz at $M = 10$
600 MHz (min.) at $M = 3$
- Low dark current: 20 nA
- Low multiplied dark current: 3 nA
- Low excess noise factor: 5 at $M = 10$
- High reliability planar structure with guard ring based on advanced InGaAs/InP material technology

APPLICATIONS

- High-bit-rate optical transmission system up to 1.0Gb/s.

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^{\circ}\text{C}$)

Parameter	Symbol	Ratings	Units
Storage Temperature	T_{stg}	-40 to $+85$	$^{\circ}\text{C}$
Operating Temperature	T_{op}	-40 to $+85$	$^{\circ}\text{C}$
Forward Current	I_F	10	mA
Reverse Current	I_R	0.5	mA

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_a = 25^{\circ}\text{C}$)

Parameters	Symbol	Test Conditions	Min.	Typ.	Max.	Units	
Quantum Efficiency (Responsivity)	η (R)	$\lambda = 1550\text{nm}$ $M = 1$	70 (0.88)	75 (0.93)	—	% (A/W)	
Breakdown Voltage	V_B	$I_D = 10\mu\text{A}$	60	80	100	V	
Temperature Coefficient of V_B	γ		—	0.15	—	$\%/^{\circ}\text{C}$	
Dark Current	I_D	$V_R = 0.9V_B$	—	20	60	nA	
Multiplied Dark Current	I_{DM}	$M = 1$	—	3	10	nA	
Excess Noise	F	$\lambda = 1550\text{nm}, M = 10$ $f = 30\text{MHz}, B = 1\text{MHz}$ $I_{po} = 2\mu\text{A}$	—	5	—	—	
	x		—	0.7	—	—	
Cut-off Frequency	f_c	$\lambda = 1550\text{nm}, R_L = 50\Omega$ $-3\text{dB from } 500\text{KHz}$	$M = 3$	0.6	—	—	GHz
			$M = 10$	1.0	1.5	—	GHz
Capacitance	C_t	$f = 1\text{MHz}, V_R = 0.9V_B$	—	0.7	1.0	pF	
Max. Multiplication Factor	M_{max}	$\lambda = 1550\text{nm}, I_{po} = 2\mu\text{A}$	30	40	—	—	

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TYPICAL CHARACTERISTICS

Fig. 1 Spectral Response (η vs. λ)

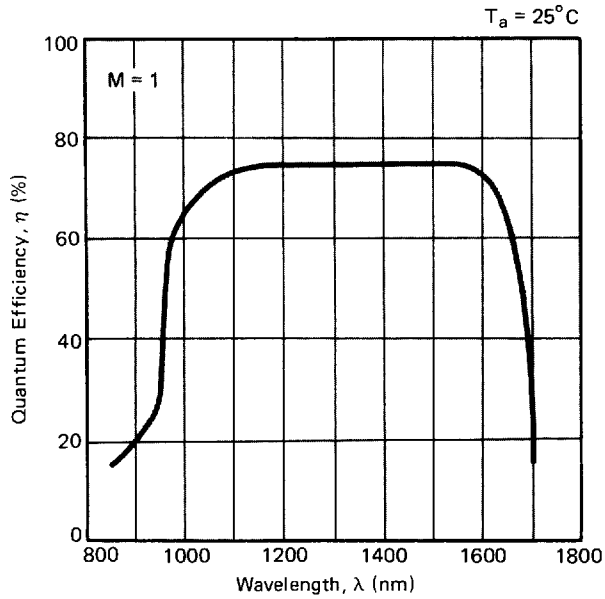


Fig. 2 Spectral Response (R vs. λ)

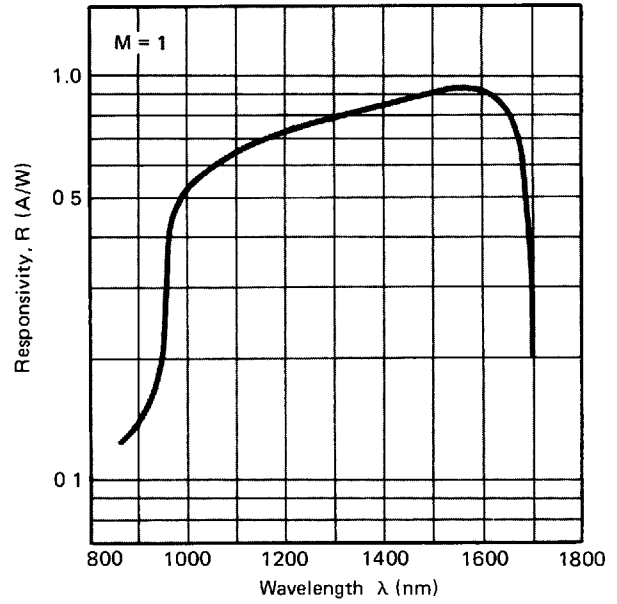


Fig. 3 Temperature Dependence of Responsivity

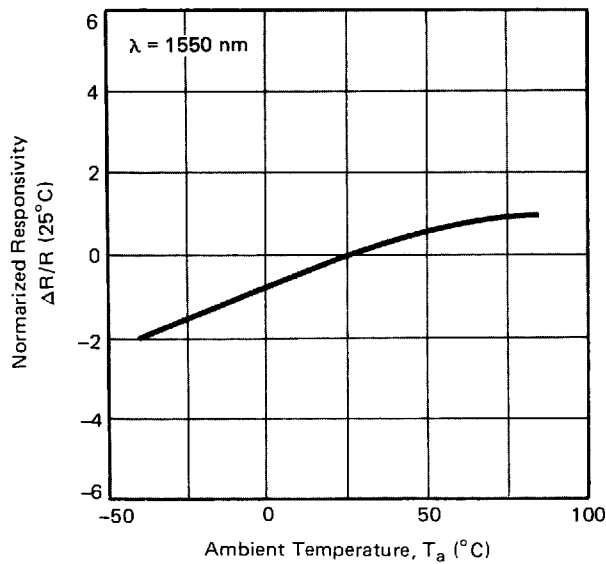
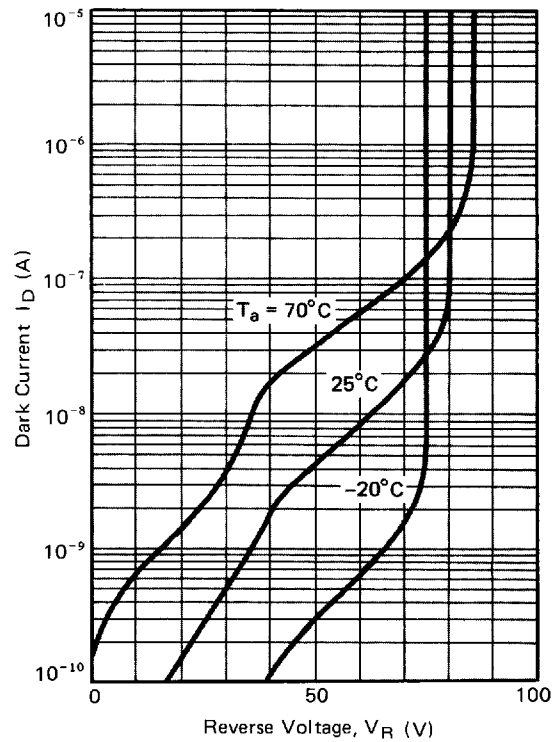


Fig. 4 Dark current vs. Reverse Voltage



InGaAs AVALANCHE PHOTODIODE

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

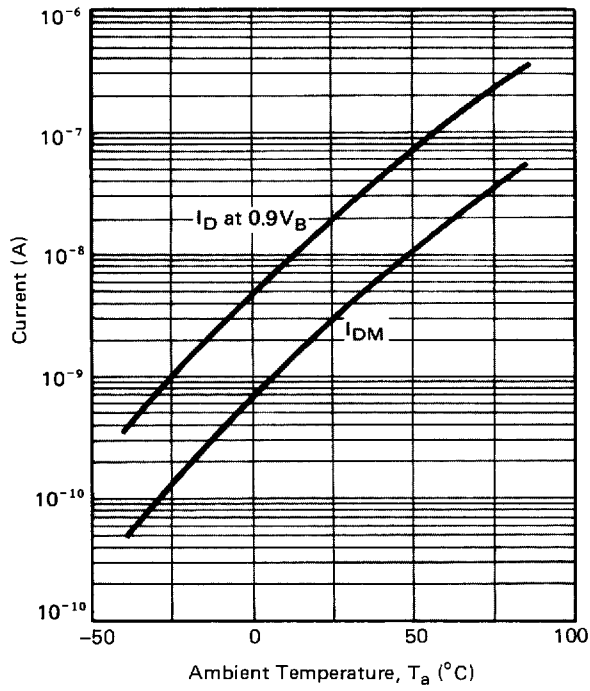


Fig. 6 Multiplication Characteristics

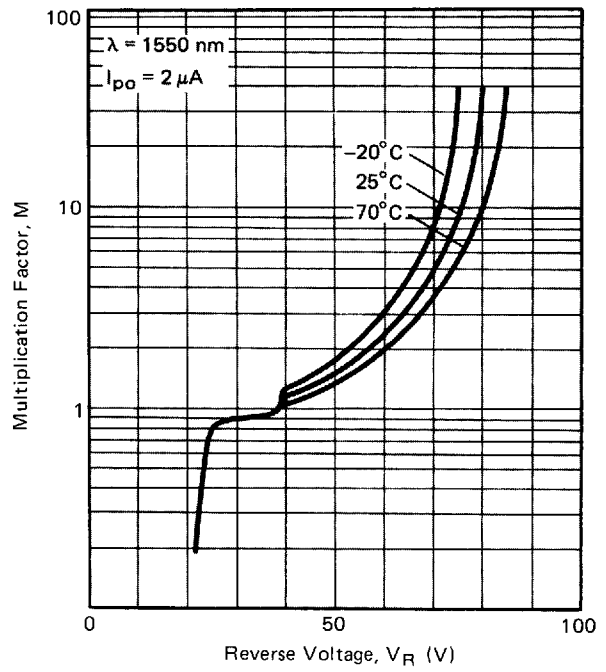


Fig. 7 Multiplication Factor vs. Photocurrent

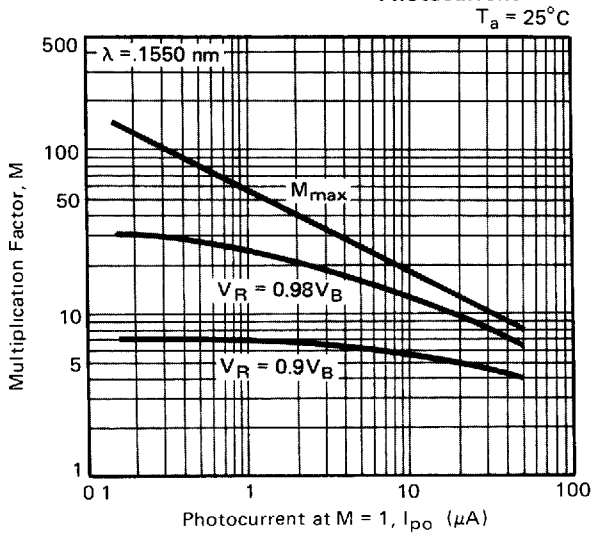


Fig. 8 Frequency Response Characteristics

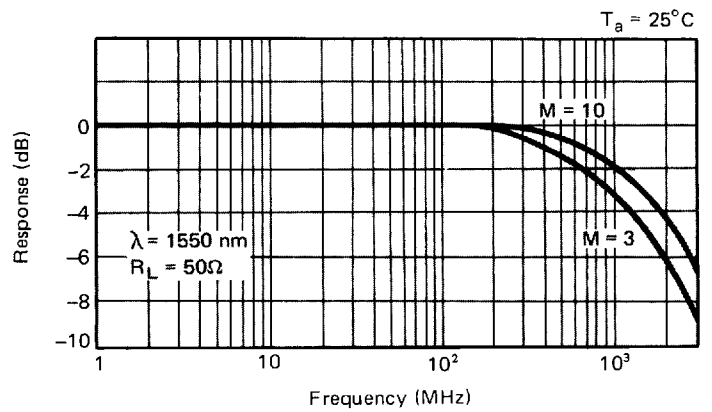


Fig. 9 Cutoff Frequency vs. Multiplication Factor

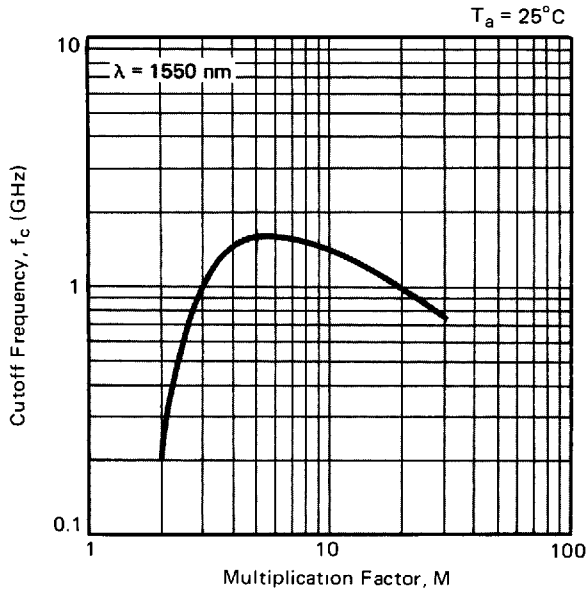


Fig. 10 Excess Noise Factor vs. Multiplication Factor

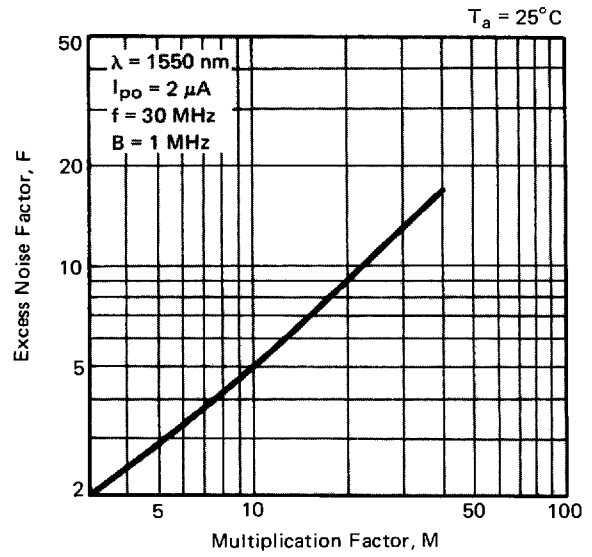


Fig. 11 Capacitance vs. Reverse Voltage

