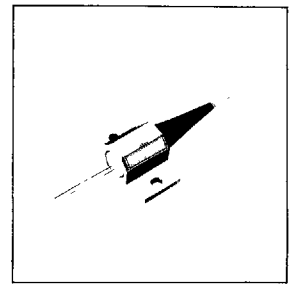
FPD13U51KS

InGaAs AVALANCHE PHOTODIODE

DESCRIPTION



The FPD13U51KS is an InGaAs Avalanche Photodiode (APD) with a multimode fiber pigtail designed for use in 1300nm 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°C
- GI50/125 multimode fiber pigtail coupled with a 50μm diam. InGaAs APD.
- High quantum efficency: 75% at 1.3 μm
- 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°C)

Parameter	Symbol	Ratings	Units
Storage Temperature	T_{stg}	–40 to +85	°C
Operating Temperature	T_{op}	–40 to +85	°C
Forward Current	I_F	10	mA
Reverse Current	I_R	0.5	mA

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_a = 25°C)

Parameters	Symbol	Test Conditions		Min.	Typ.	Max.	Units
Quantum Efficiency (Responsivity)	η (R)	λ = 1300nm, M = 1		70 (0.78)	75 (0.78)	–	% (A/W)
Breakdown Voltage	V	I_D = 10μA		60	80	100	V
Temperature Coefficient of V_B	γ			–	0.15	–	%/°C
Dark Current	I_D	VR = 0.9V_B		–	20	60	nA
Multiplied Dark Current	I_{DM}	M = 1		–	3	10	nA
Excess Noise	F	λ = 1300nm, M = 10 f = 30MHz, B=1MHz I_{po} = 2μA		–	5	–	–
	x			–	0.7	–	–
Cut-off Frequency	f_c	λ=1300nm, R_L=50Ω –3dB from 500KHz	M=3	0.6	–	–	GHz
			M=10	1.0	1.5	–	GHz
Capacitance	C_t	f = 1MHz, V_R = 0.9V_B		–	0.7	1.0	pF
Max. Multiplication Factor	M_{max}	λ = 1300nm, I_{po} = 2μA		30	40	–	–

FPD13U51KS

TYPICAL CHARACTERISTICS

Fig. 1 Spectral Response (η vs. λ)

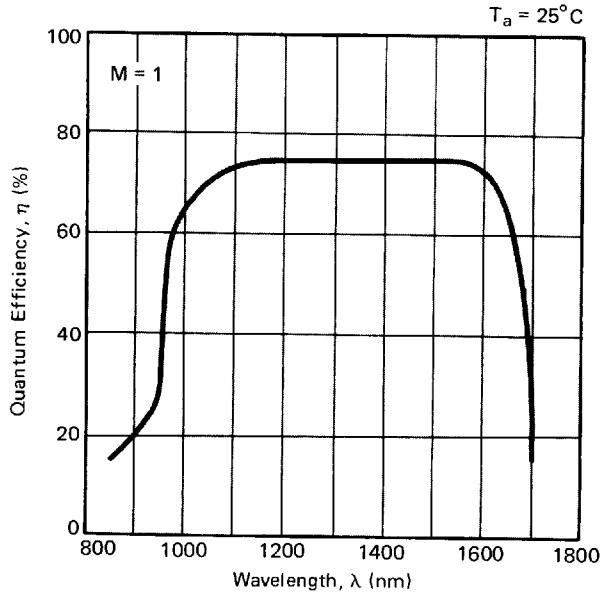


Fig. 2 Spectral Response (R vs. λ)

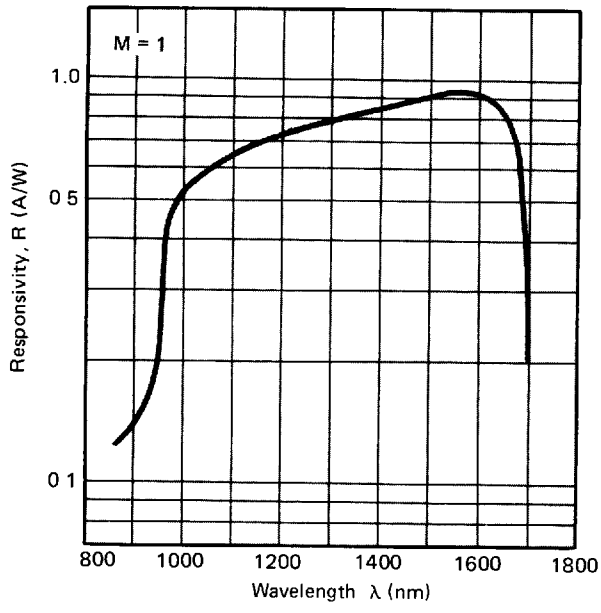


Fig. 3 Temperature Dependence of Responsivity

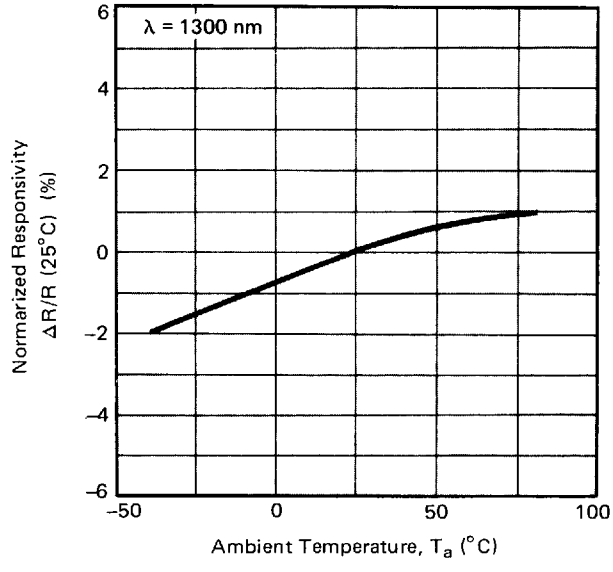


Fig. 4 Dark current vs. Reverse Voltage

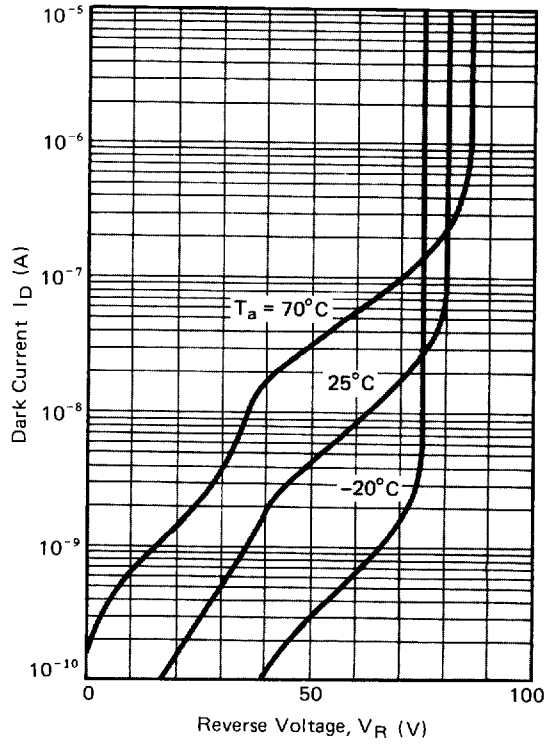


Fig. 5 Temperature Dependence of Dark Current and Multiplied Dark Current

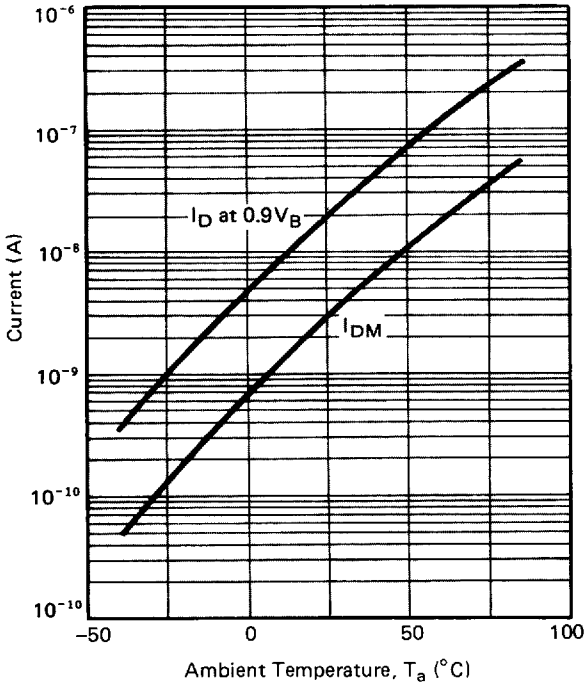


Fig. 6 Multiplication Characteristics

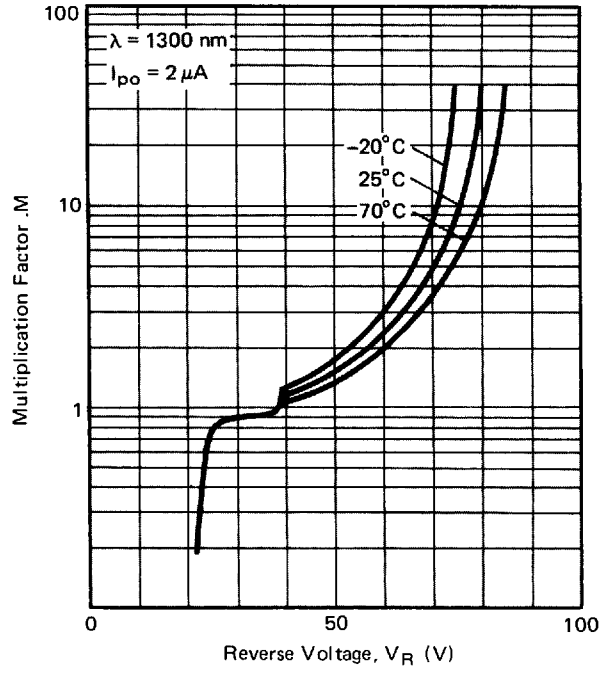


Fig. 7 Multiplication Factor vs. Photocurrent

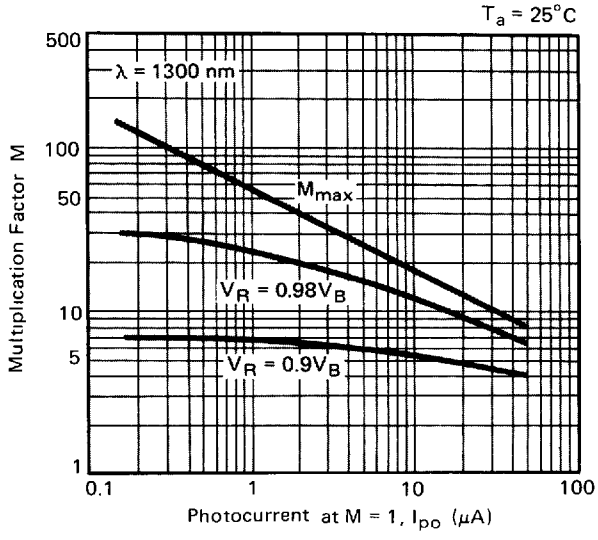


Fig. 8 Frequency Response

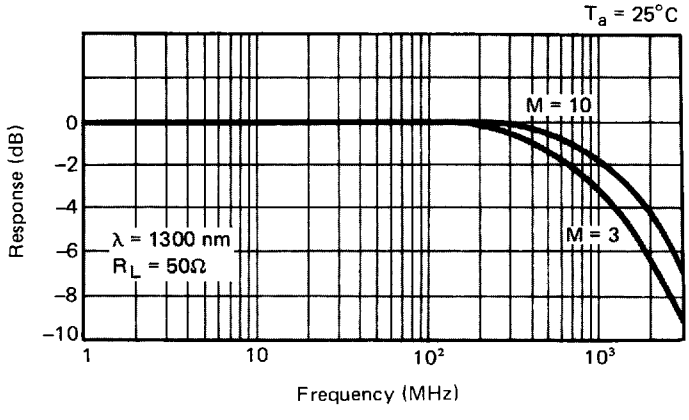


Fig. 9 Cutoff Frequency vs. Multiplication Factor

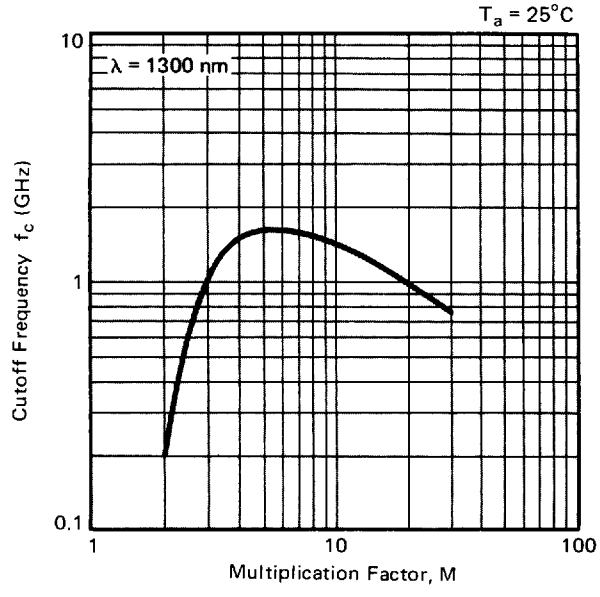


Fig. 10 Excess Noise Factor vs. Multiplication Factor

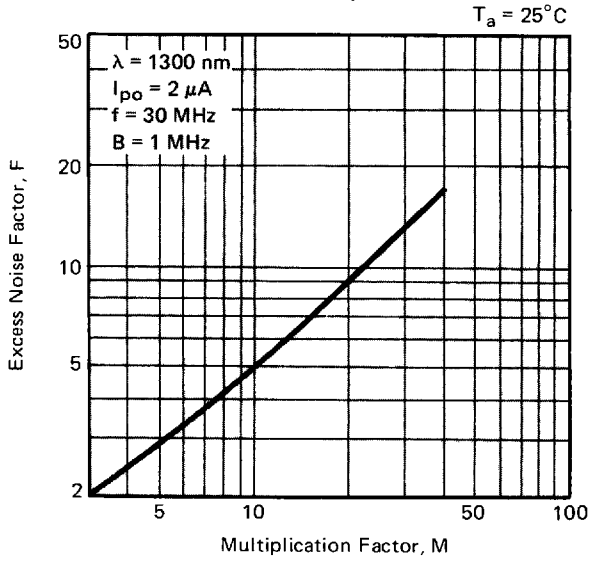


Fig. 11 Capacitance vs. Reverse Voltage