

Approved		Charged
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Customer Approval	Approved	

Specification proposal

(2.5Gbps. APD Preamp Module Vcc=+3.3V)

FU-319SPA-6M20/V6M20/W6M20

PRELIMINARY

MITSUBISHI ELECTRIC CORP.

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Date		Approved	
1.Mar.'02		H.Kiyosue	

PRELIMINARY

MITSUBISHI (OPTICAL DEVICES)

FU-319SPA-6M20/V6M20/W6M20**InGaAs APD PREAMP MODULE FOR THE 1.31 μm AND 1.55 μm WAVELENGTH RANGE****DESCRIPTION**

FU-319SPA-6M20/V6M20/W6M20 is InGaAs avalanche photodiode module with SiGe preamplifier, designed for use in high-speed, long haul optical communication systems.

The coaxial package contains InGaAs avalanche photodiode coupled with single-mode fiber pigtail and SiGe preamplifier.

FEATURES

- High-sensitivity (-33dBm typ)
- 5pin coaxial package
- Single power supply voltage +3.3V.
- Differential output (50 Ω)

APPLICATION

2.5Gbps optical receiver (OC-48, STM-16)
Extended reach datacom and telecom applications
Long haul optical communication systems

ABSOLUTE MAXIMUM RATINGS (T_c=25°C)

Parameter	Symbol	Rating	Unit
APD Reverse voltage	VPD	0~Vbr	V
APD Reverse current (CW)	I _r	2	mA
APD Forward current (CW)	I _f	2	mA
Power supply voltage	VCC	-0.5~6	V
Operating case temperature	T _c	-40~+85	°C
Storage temperature	T _{stg}	-40~+85	°C

Vbr: APD breakdown voltage.

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ELECTRICAL/OPTICAL CHARACTERISTICS ($T_c=25^\circ\text{C}, \lambda=1.55\mu\text{m}, V_{CC}=3.3\text{V}$, unless otherwise noted)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Detection range	-	-	1000	-	1600	nm
Responsivity	R13	CW, $\lambda=1.3\mu\text{m}, M=1$	0.7	0.85	-	A/W
	R15	CW, $\lambda=1.55\mu\text{m}, M=1$	0.8	0.9	-	
Breakdown voltage	Vbr	$I_d=100\mu\text{A}$	35	-	75	V
Temp.coefficient of Vbr (Note 3)	γ	$I_d=100\mu\text{A}, T_c=-40\sim 85^\circ\text{C}$	0.07	0.12	0.16	V/ $^\circ\text{C}$
Transimpedance	Zt	AC, $f=200\text{MHz}, R_L=50\Omega$, $P_{in}=-27\text{dBm}, M=10$, Single end, (Note 1)	1.0	1.37	1.75	k Ω
Maximum output voltage	Vod_max	AC, $R_L=50\Omega, P_{in}=-10\text{dBm}$, $M=10$, Single end,	75	150	310	mV
Cutoff frequency(-3dB)	fc_High	AC, $R_L=50\Omega, M=10$	1.6	1.9	-	GHz
	fc_Low	AC, $R_L=50\Omega$	-	30	100	kHz
Average input equivalent noise current density	in	AC, $R_L=50\Omega, 1\text{MHz}\sim 1.6\text{GHz}$	-	10	-	pA/ $\sqrt{\text{Hz}}$
Output impedance	Zo	(Differential output)	-	50	-	Ω
Sensitivity	Pr	AC, $R_L=50\Omega, \lambda=1.55\mu\text{m}$, NRZ, 2.48832Gbps.,	-	-33	-31	dBm
Over load power	Po	PRBS=2 ²³ -1, BER=10 ⁻¹⁰ , VPD=Optimum value (Note 2)	-7	-5	-	
Power supply voltage	VCC	-	3.1	3.3	3.5	V
Power supply current	ICC	VCC=3.3V	-	35	60	mA
Optical return loss	Prtn	$\lambda=1.55\mu\text{m}$	27	-	-	dB

Note 1. $Z_t = \text{OUTN} / I_{in}$ I_{in} : Preamp input current amplitude.

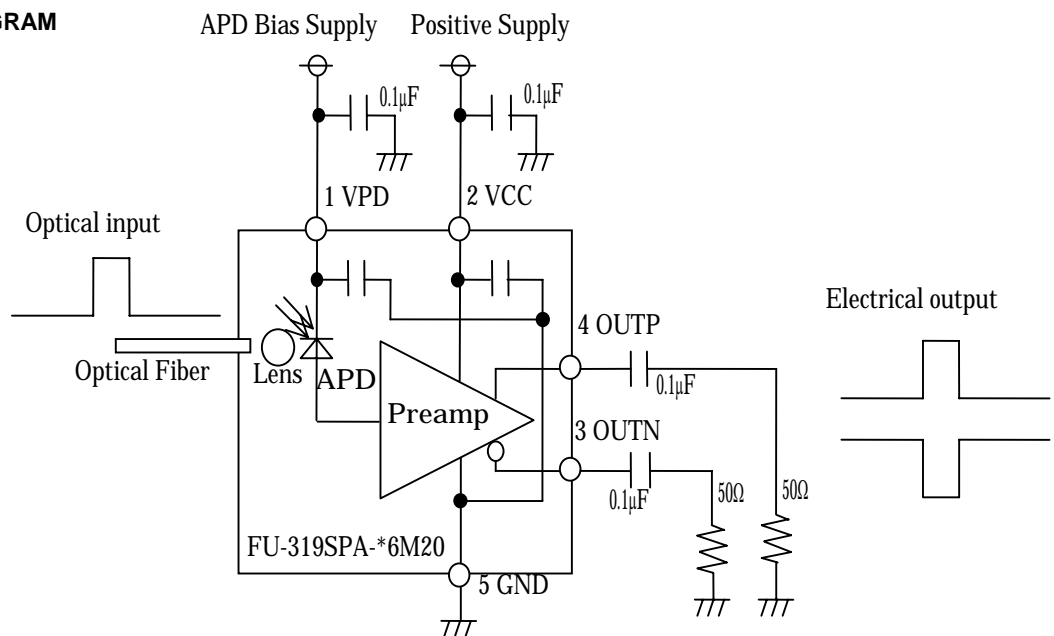
Note 2. Used post-amp bandwidth is 1.86GHz, Laser source extinction ratio is 10dB.

Note 3. $\gamma = (V_{br}(25^\circ\text{C} + \Delta T) - V_{br}(25^\circ\text{C})) / \Delta T$ [V/ $^\circ\text{C}$]

OPTICAL FIBER SPECIFICATION

Parameter	Limits			Unit
	FU-319SPA-6M20	FU-319SPA-V6M20	FU-319SPA-W6M20	
From of fiber end on delivery	Cut or ferrule	FC/PC connector	SC/PC connector	-
Type	SM			-
Mode field dia.	9.5 \pm 1			μm
Cladding dia.	125 \pm 2			μm
Jacket dia.	0.9 typ.			mm
Connector return loss	40(min)			dB

BLOCK DIAGRAM



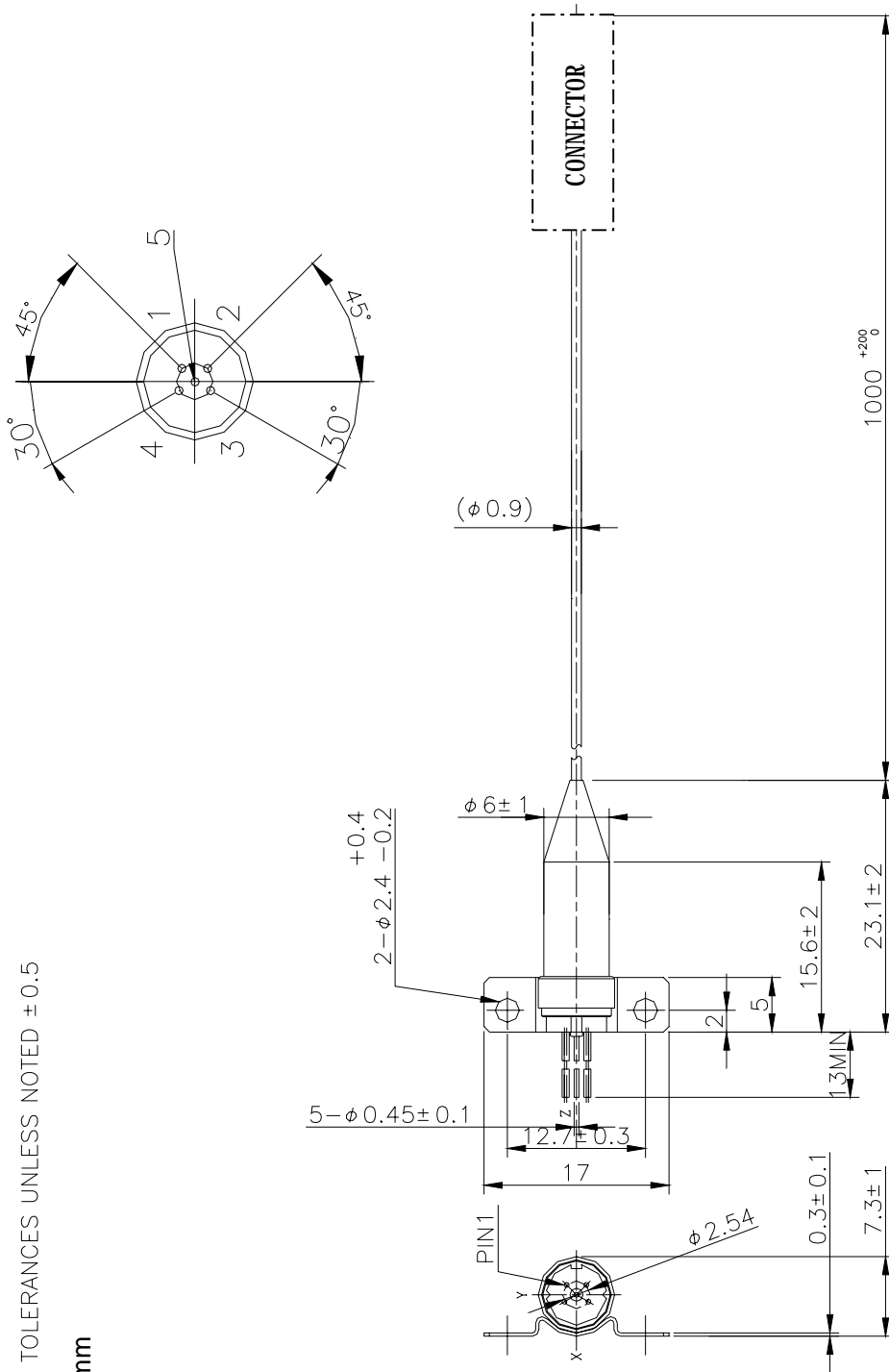
PRELIMINARY

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Note 1. TOLERANCES UNLESS NOTED ± 0.5

UNIT:mm

- 1: VPD
- 2: VCC
- 3: OUTN
- 4: OUTP
- 5: GND