

**MITSUBISHI (OPTICAL DEVICES)**  
**FU-311SPP-CV4****InGaAs PD PREAMP MODULE FOR THE 1.31  $\mu\text{m}$  AND 1.55  $\mu\text{m}$  WAVELENGTH RANGE****DESCRIPTION**

FU-311SPP-CV4 is InGaAs pin photodiode module with Si preamplifier, designed for use in high-speed, long haul optical communication systems. The coaxial package contains InGaAs pin photodiode coupled with single-mode fiber pigtail and Si preamplifier.

**FEATURES**

- High-sensitivity (-32dBm typ)
- 4pin coaxial package
- Single power supply (+3.3V)
- Si preamplifier with AGC function
- Single ended output

**APPLICATION**

622Mbps.optical receiver (OC-12, STM-4)  
Extended reach datacom and telecom applications  
Long haul optical communication systems

**ABSOLUTE MAXIMUM RATINGS** (Tc=25°C)

| Parameter                  | Symbol           | Conditions | Rating  | Unit |
|----------------------------|------------------|------------|---------|------|
| PD Reverse voltage         | VPD              | VCC=0V     | 15      | V    |
| PD Reverse current (CW)    | I <sub>r</sub>   | -          | 0.7     | mA   |
| PD Forward current (CW)    | I <sub>f</sub>   | -          | 2       | mA   |
| Power supply voltage       | VCC              | VEE=0V     | 0~4     | V    |
| Operating case temperature | T <sub>c</sub>   | -          | -20~+85 | °C   |
| Storage temperature        | T <sub>stg</sub> | -          | -40~+85 | °C   |

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**ELECTRICAL/OPTICAL CHARACTERISTICS** ( $T_c=25^\circ\text{C}$ ,  $\lambda=1.3\mu\text{m}$ ,  $V_{CC}=3.3\text{V}$ ,  $V_{EE}=0\text{V}$  unless otherwise noted)

| Parameter                                      | Symbol | Test Conditions                                                                                                    | Limits |      |       | Unit                         |
|------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------------|--------|------|-------|------------------------------|
|                                                |        |                                                                                                                    | Min.   | Typ. | Max.  |                              |
| Detection range                                | -      | -                                                                                                                  | 1000   | -    | 1600  | nm                           |
| Responsivity(Note 1)                           | R      | CW                                                                                                                 | 0.75   | 0.85 | -     | A/W                          |
| Transimpedance                                 | $Z_t$  | AC, $f=1\text{MHz}$<br>AGC_off (Note 1)                                                                            | -      | 6    | -     | $k\Omega$                    |
| Cutoff frequency                               | $f_c$  | AC, $R_L=50\Omega$ (Note 2)                                                                                        | 420    | -    | -     | MHz                          |
| Average input equivalent noise current density | $i_n$  | AC, $R_L=50\Omega$ , 100kHz~420MHz (Note 2)                                                                        | -      | 2.5  | -     | $\text{pA}/\sqrt{\text{Hz}}$ |
| Output impedance                               | $Z_o$  | (Emitter follower) (Note 3)                                                                                        | -      | Low  | -     | $\Omega$                     |
| Sensitivity                                    | Pr     | AC, $R_L=50\Omega$ ,<br>NRZ, 622.08Mbps.,<br>PRBS=2 <sup>23</sup> -1, BER=10 <sup>-10</sup> ,<br>VPD=3.3V (Note 2) | -      | -32  | -28   | dBm                          |
| Over load power                                | Po     |                                                                                                                    | -8     | -5   | -     |                              |
| Power supply voltage                           | VCC    | VEE=0V                                                                                                             | 3.135  | 3.3  | 3.465 | V                            |
| Power supply current                           | ICC    | VCC=3.3V                                                                                                           | -      | 15   | 20    | mA                           |
| Optical return loss                            | Prtn   | -                                                                                                                  | 25     | -    | -     | dB                           |

Note 1. Transimpedance value apply when AGC function is fully off.

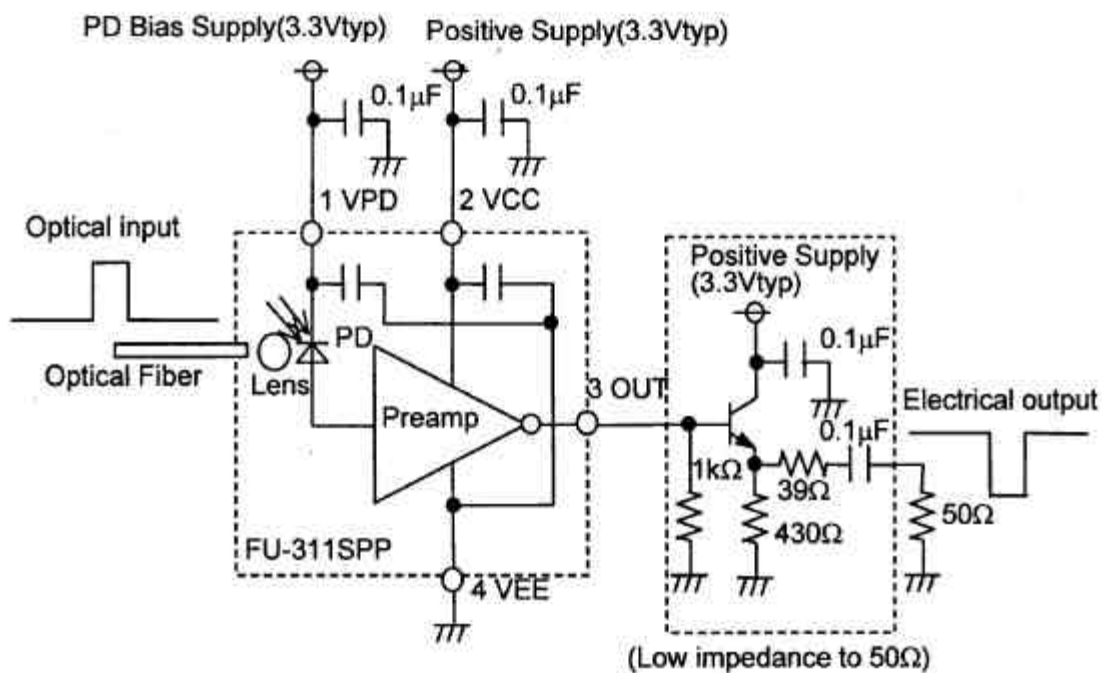
Note 2. Impedance changer (Emitter follower to 50 $\Omega$ ) used.

Note 3. Preamp output buffer can not drive of the 50 $\Omega$  load. Please connect to the high impedance circuit.

## OPTICAL FIBER SPECIFICATION

| Parameter             | Limits      | Unit          |
|-----------------------|-------------|---------------|
| Fiber type            | Single mode | -             |
| Mode field dia.       | 9.5 $\pm$ 1 | $\mu\text{m}$ |
| Cladding dia.         | 125 $\pm$ 2 | $\mu\text{m}$ |
| Jacket dia.           | 0.9 typ.    | mm            |
| Connector type        | FC          | -             |
| Connector return loss | 40(min)     | dB            |

## BLOCK DIAGRAM



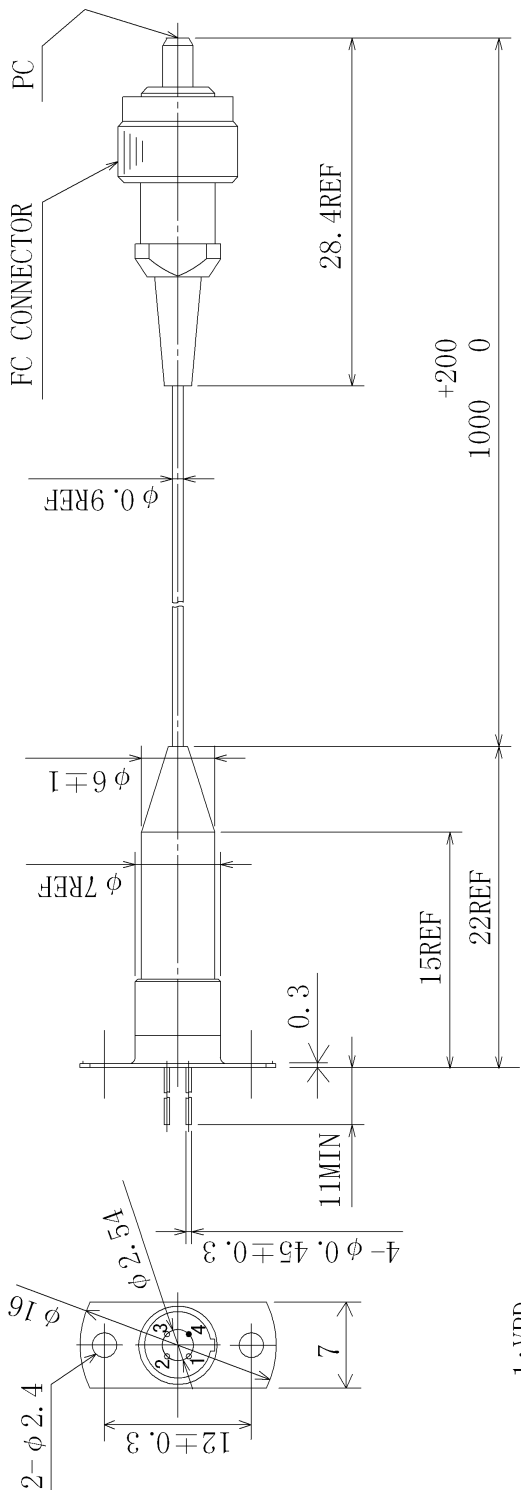
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OUTLINE DIAGRAM

(Unit : mm)

NOTE 1. TOLERANCES UNLESS NOTED ±0.5



- 1: VPD
- 2: VCC
- 3: OUT
- 4: VEE (Isolated to the case)