

# InGaAs-APD/Preamp Receiver

FRM5W232FY

## FEATURES

- 5pins co-axial ROSA(Receiver Optical Subassembly) with LC Receptacle
- APD with +3.3V pre-amplifier
- Wide band: 2.2GHz
- Data rate up to 2.7Gb/s
- Differential output
- High sensitivity: -34dBm typ
- Operating case temperature: -40°C to 85°C



## APPLICATION

This APD detector preamp is intended to function as an optical receiver in long reach SONET,SDH, and DWDM systems operating up to 2.7Gb/s. The device operates in both the 1,310 and 1,550nm wavelength windows. The detector preamplifier has a differential electrical output.

## DESCRIPTION

This APD preamplifier uses an InGaAs APD chip with GaAs transimpedance preamplifier. The FY package is a 5-pin coaxial ROSA (Receiver Optical Subassembly) with LC receptacle. This device is in compliance with ITU-T recommendations and meets the Telcordia requirements.

## ABSOLUTE MAXIMUM RATINGS(Tc=25°C, unless otherwise specified)

| Parameter             | Symbol | Ratings |          | Units |
|-----------------------|--------|---------|----------|-------|
|                       |        | Min.    | Max.     |       |
| Storage Temperature   | Tstg   | -40     | +85      | °C    |
| Operating Temperature | Top    | -40     | +85      | °C    |
| Supply Voltage        | Vdd    | 0       | 4.5      | V     |
| APD Reverse Voltage   | VR     | 0       | VB(Note) | V     |
| APD Reverse Current   | IR     | -       | 3(peak)  | mA    |

Note: VB differs from device to device. VB data is attached to each device.

## OPTICAL AND ELECTRICAL CHARACTERISTICS

(Tc=25°C, λ=1550nm, Vdd=+3.3V, unless otherwise specified)

| Parameter                              | Symbol | Test Conditions  | Limits         |              |       | Units     |     |     |
|--|--------|--|----------------|--------------|-------|-----------|-----|-----|
|  |        |  | Min.           | Typ.         | Max.  |           |     |     |
| APD Responsivity                       | R      | λ=1310nm, M=1  | 0.75           | 0.80         | -     | A/W       |     |     |
|  |        | λ=1550nm, M=1  | 0.80           | 0.85         | -     |           |     |     |
|  |        | λ=1610nm, M=1  | -              | 0.70         | -     |           |     |     |
| APD Breakdown Voltage                  | VB     | ID=10uA  | 40             | 50           | 65    | V         |     |     |
| Temperature Coefficient of VB          | Γ      | (Note.1)   | 0.08           | 0.12         | 0.15  | V/°C      |     |     |
| AC Transimpedance                      | Zt     | Pin=-30dBm, f=100MHz, Single-end   | 1800           | 2200         | 2600  | ohm       |     |     |
| Bandwidth                              | BW     | Pin=-30dBm, M=10   | 2.2            | 2.5          | -     | GHz       |     |     |
| Lower Cut-off Frequency                | fcl    | -3dB from 1MHz   | -              | 50           | 75    | kHz       |     |     |
| Peaking                                | dpk    | Pin=-30dBm, M=10, from 1MHz  | -              | -            | +2    | dB        |     |     |
| Group Delay Deviation                  | GD     | Pin=-30dBm, M=10 from 500MHz to 1.75GHz  | -              | 60           | -     | psec      |     |     |
| Output Return Loss                     | S22    | up to 1.75GHz  | 10             | -            | -     | dB        |     |     |
|  |        | up to 2.5GHz   | 5              | -            | -     |           |     |     |
| Equivalent Input Noise Current Density | IN     | Average within 2.2GHz  | -              | 9.5          | 11    | pA/sqrtHz |     |     |
| Minimum Sensitivity                    | Pr     | 2.48832Gb/s, NRZ, PRBS=2 <sup>23</sup> -1, BER=10 <sup>-10</sup> , VR=Optimum (Note.3) | Rext =14dB     | 25°C         | -     | -34       | -33 | dBm |
|  |        |  |                | -40°C ~ 85°C | -     | -33       | -31 |     |
|  |        |  | Rext=10dB,25°C |              | -     | -33       | -   |     |
| Maximum Overload                       | Pmax   | 2.48832Gb/s, NRZ, PRBS=2 <sup>23</sup> -1, BER=10 <sup>-10</sup> , M=3                 | -5             | -            | -     | dBm       |     |     |
|  |        | M=3 (Note.4)   | -7             | -            | -     |           |     |     |
| Maximum Output Voltage Swing           | Vclip  | Saturated Output Voltage   | 450            | 550          | 800   | mV        |     |     |
| Optical Return Loss                    | ORL    | -  | 27             | -            | -     | dB        |     |     |
| Power Supply Current                   | Idd    | -  | -              | 45           | 70    | mA        |     |     |
| Power Supply Voltage                   | Vdd    | -  | +3.15          | +3.30        | +3.45 | V         |     |     |

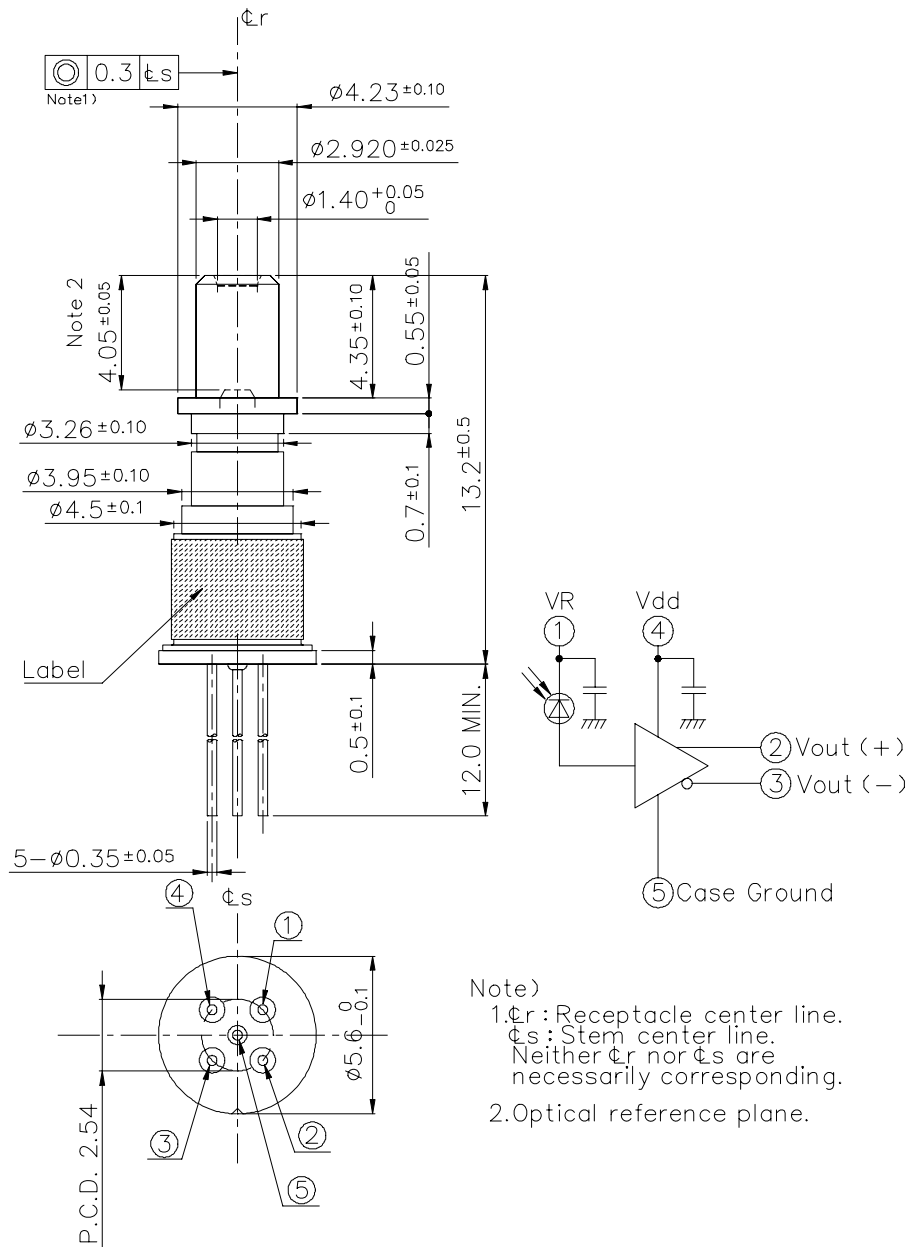
Note.1: Gamma=dVB/dTc

Note.2: All the parameters are measured with 50ohm AC-coupled.

Note.3: with fc=1866MHz Bessel filter

Note.4: Defined by 10% distortion of wave form

UNIT:mm



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