

# Mini-DIL Type Receiver Module for 2.5 G bit/s Optical Transmission

## FRM5W231BS

The FRM5W231BS is a high sensitivity and wide-band APD / preamplifier module integrated APD and the GaAs preamplifier IC in the Mini-DIL (Mini Dual In Line) type package.

\* Mini-DIL: Mini Dual In Line

### Product Description

With the spread of the Internet, there is a growing demand for large-volume, high-speed optical communications. The DWDM (Dense Wavelength Division Multiplexing) Metropolitan Optical Network must be built with high-performance 2.5Gbit/s systems, and electrical engineers are striving to design optical devices that satisfy a diversity of demanding requirements such as high-speed access, sophisticated transmission characteristics, compact sizes, higher reliability, and lower prices. To keep in pace with the demands, FUJITSU has commercialized the APD/preamplifier receiver module for 2.5Gbit/s optical transmissions. The new module features an InGaAs Avalanche Photo Diode (APD) and a GaAs preamplifier IC integrated in a Mini-DIL type package.

### Product Features

#### Wide-band

To achieve high-sensitivity and wide-band performance, FRM5W231BS is designed to minimize parasitic density and inductance between APD chip and Preamplifier IC.

#### High gain and low power dissipation

Preamplifier IC is designed to integrated with transimpedance amplifier and differential limiting amplifier on one chip.

And it achieve high gain of  $2k\Omega$  in low optical input power, low noise and low power consumption of below  $0.4mW$  at the same time.

Photo 1 External View



Table 1 APD Principal Characteristics of the Receiver Module

Item	Characteristics
Bandwidth	$>1.8GHz$ @M=3 to 12, $-40$ to $85^{\circ}C$
Sensitivity	$-34dBm$ (Typical) @BER= $10^{-10}$
Transimpedance Gain	$2000\Omega$ (Typical)

### 50Ω matched differential output

The module output is positive and negative differential, each matched to 50 ohms.

## Product Characteristics

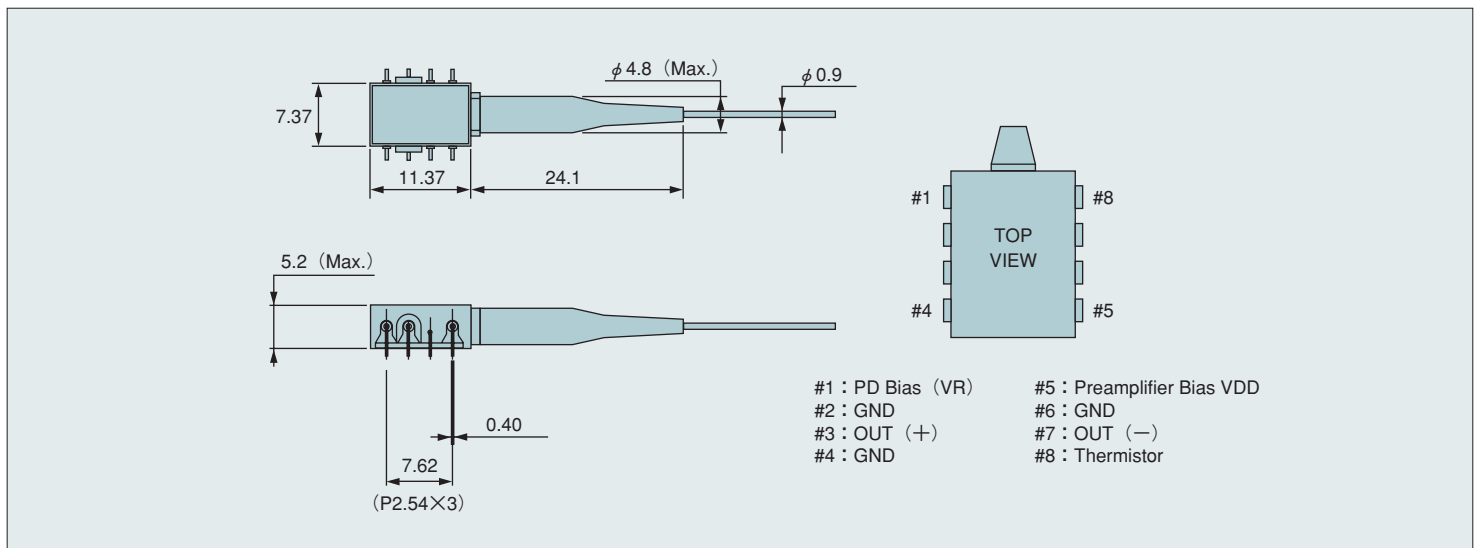
**Table 1** shows the main characteristics of APD receiver module for 2.5Gb/s. **Fig.1, 2, 3** and **4** show a dimensional outline drawing, frequency characteristics, output voltage characteristics and transmission characteristics, respectively.

This is in a hermetic package with a 2.54mm lead pitch.

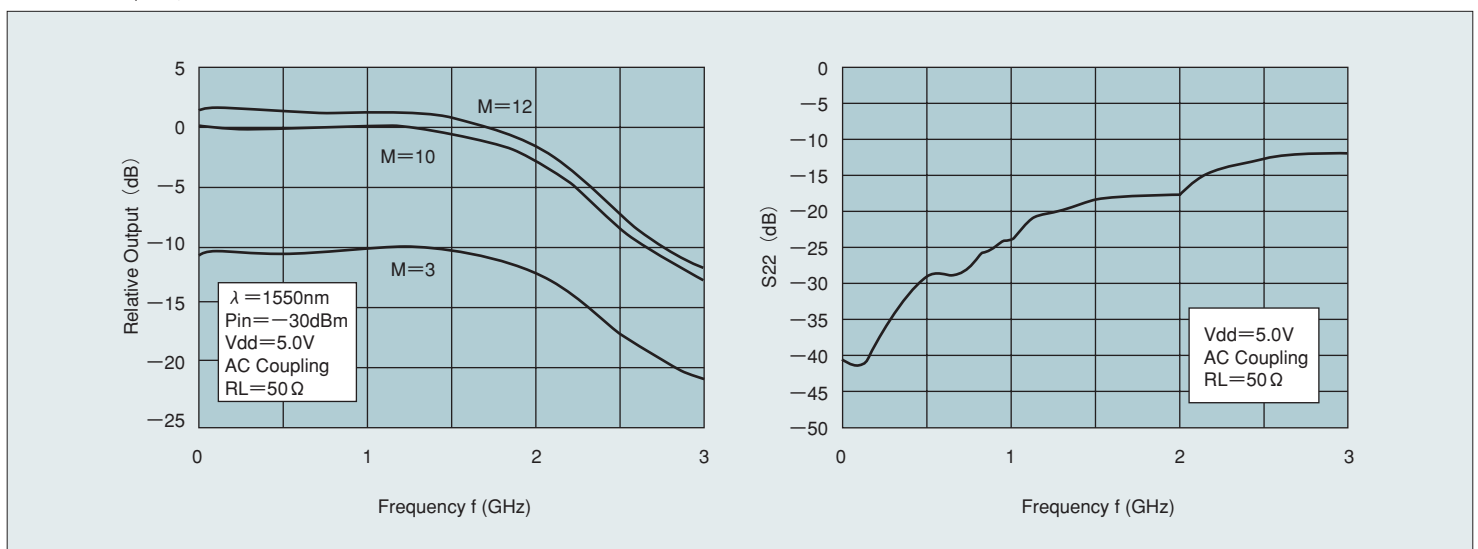
As shown in frequency response, it is suitable for 2.5Gb/s application with bandwidth of 1.8GHz at multiplication factor  $M=3$  to 10, and  $S_{22}$  of  $-10\text{dB}$  or lower at frequency up to 3GHz. Output voltage amplitude increases proportional to input optical currents up to  $200\mu\text{Ap-p}$ , and output voltage amplitude is constant at  $400\text{mVp-p}$  for larger input optical currents. Transmission characteristics is realized in high sensitivity of  $-34\text{dBm}$  at an error rate of  $10^{-10}$  at  $25^\circ\text{C}$ .

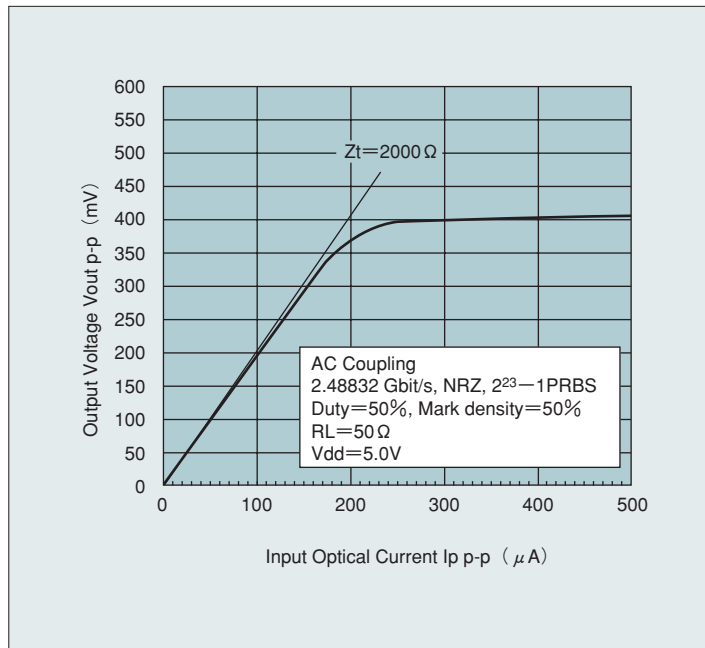


**Figure 1** Dimensional Outline Drawing



**Figure 2** Frequency Characteristics



**Figure 3** Output Voltage Characteristics**Figure 4** Transmission Characteristics