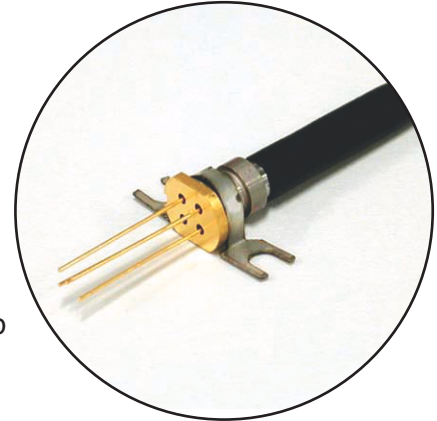


## FEATURES

- Data Rates up to 2.7Gb/s
- High Sensitivity: -34 dBm (typ.)
- Differential Electrical Output
- Preamplifier Power Supply Voltage: +3.3V
- Wide operating temperature range: -40 to +85°C

## APPLICATIONS

This APD detector preamp is intended to function as an optical receiver in long haul 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 is DC coupled with a differential electrical output.



## DESCRIPTION

The FRM5W232HY incorporates an InGaAs Avalanche Photodiode (APD) detector, a GaAs IC transimpedance preamplifier. The APD is processed with modern MOVPE techniques resulting in reliable performance over a wide range of operating conditions. The lens coupling system and the single mode fiber are assembled using Nd: YAG welding. The HY package is secured by a horizontal flange.

## ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub>=25°C, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Storage Temperature	T <sub>stg</sub>	-40 to +85	°C
Operating Case Temperature	T <sub>op</sub>	-40 to +85	°C
Supply Voltage	V <sub>DD</sub>	0 to +4.5	V
APD Reverse Voltage	V <sub>R</sub>	0 to V <sub>B</sub> (Note)	V
APD Reverse Current	I <sub>R(peak)</sub>	3	mA

Note: Since V<sub>B</sub> may vary from device-to-device, V<sub>B</sub> data is attached to each device for reference.

## OPTICAL &amp; ELECTRICAL CHARACTERISTICS

(T<sub>C</sub>=25°C, λ=1,550nm, V<sub>DD</sub>=+3.3V unless otherwise specified)

Parameter	Symbol	Test Conditions	Limits			Unit	
			Min.	Typ.	Max.		
APD Responsivity	R13	λ = 1,310nm, M=1	0.75	0.80	-	A/W	
	R15	λ = 1,550nm, M=1	0.80	0.85	-		
	R16	λ = 1,610nm, M=1	-	0.70	-		
APD Breakdown Voltage	VB	ID=10μA	40	50	65	V	
Temperature Coefficient of VB	γ	Note (1)	0.08	0.12	0.15	V/°C	
AC Transimpedance	Z <sub>t</sub>	Pin=-30dBm, f=100MHz, Single-end	1800	2200	2600	Ω	
Bandwidth	BW	Pin=-30dBm, M=10, -3dB from 1MHz	2.2	2.5	-	GHz	
Lower Cut-Off Frequency	f <sub>cl</sub>		-	50	75	kHz	
Peaking	d <sub>pk</sub>	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	i <sub>n</sub>	Average within 2.2GHz	-	9.5	11	pA/√Hz	
Minimum Sensitivity	P <sub>r</sub>	Note (4)	Ta=25°C, Rext=14dB	-	-34.0	-33.0	dBm
			Ta=-40°C ~ 85°C, Rext=14dB	-	-33.0	-31.0	
			Ta=25°C, Rext=10dB	-	-33.0	-	
Maximum Overload	P <sub>max</sub>	2.488Gb/s, NRZ, PRBS=2 <sup>23</sup> -1, BER=10 <sup>-10</sup> , M=3	-5	-	-	dBm	
		M=3, Note (3)	-7	-	-		
Maximum Output Voltage Swing	V <sub>clip</sub>	Saturated Output Voltage	450	550	800	mV	
Optical Return Loss	ORL	-	30	-	-	dB	
Power Supply Current	I <sub>DD</sub>	-	-	45	70	mA	
Power Supply Voltage	V <sub>DD</sub>	-	3.15	3.30	3.45	V	

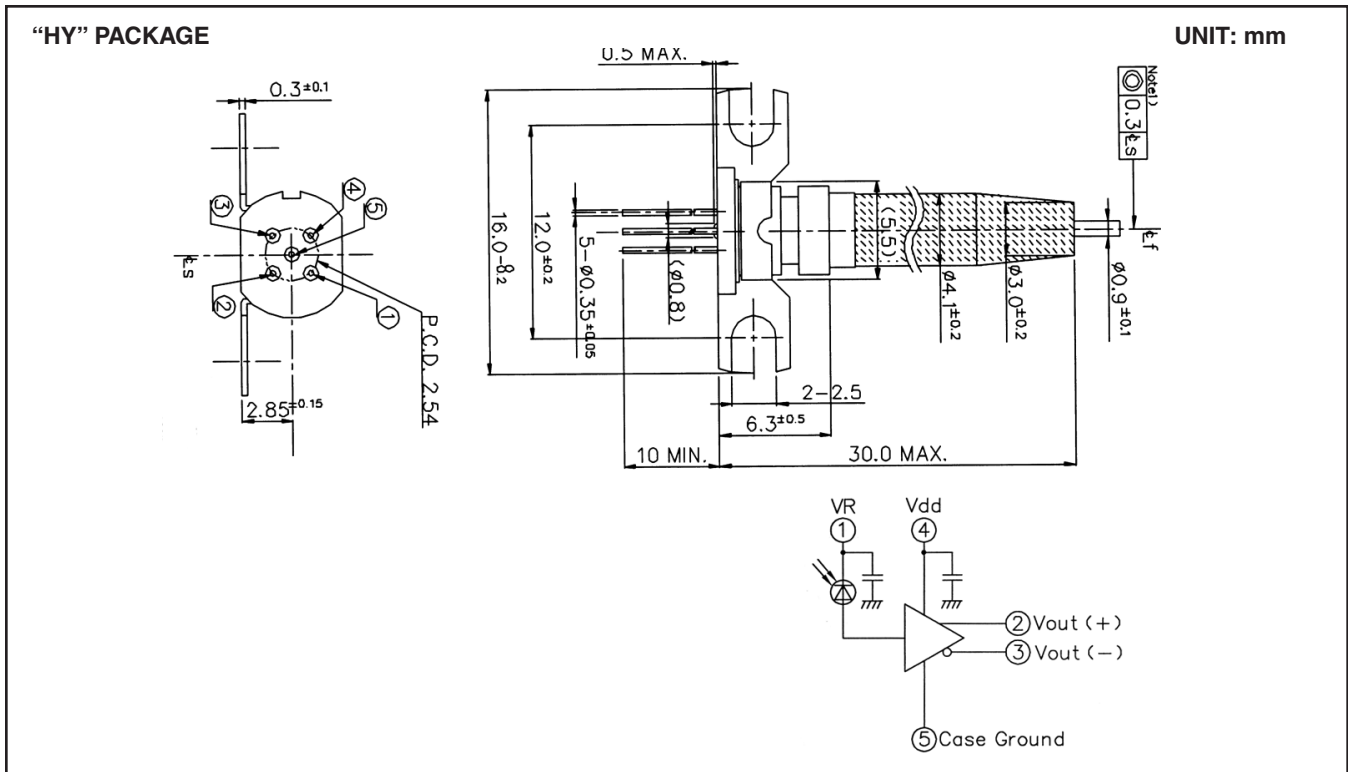
Note: (1) γ= VB/ Tc

Note: (2) All the parameters are measured with 50Ω AC-coupled.

Note: (3) Defined by 10% distortion of wave form.

Note: (4) Test condition is 2.488Gb/s, NRZ, PRBS=2<sup>23</sup>-1, B.E.R.=10<sup>-10</sup>, VR=Optimum with f<sub>c</sub> = 1866 MHz Bessel filter.

Notes



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