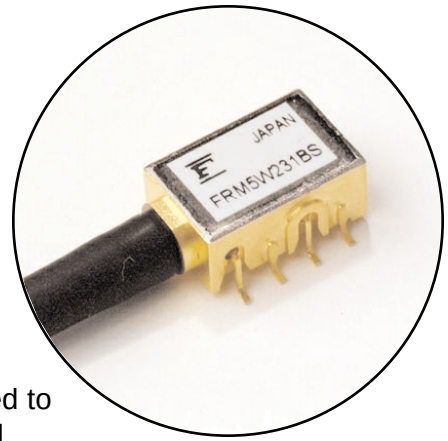
FEATURES

- 2.5Gb/s APD Receiver module in industry standard mini-DIL package
- -34 dBm Sensitivity (Typ.)
- -4 dBm Overload (Typ.)
- Integral Thermistor
- Integral GaAs IC Preamp
- Differential Electrical Output



APPLICATIONS

This 40 GHz gain bandwidth product APD detector preamp is intended to function as an optical receiver in long haul SONET, SDH, and DWDM systems operating at 2.5 Gb/s. The device operates in both the 1,310 and 1,550nm wavelength windows. The nominal 10KΩ integral thermistor allows accurate monitoring of the APD temperature and facilitates the design of the APD bias control circuits. The detector preamplifier is DC coupled with a differential electrical output.

DESCRIPTION

The FRM5W231BS incorporates a 30 micron InGaAs Avalanche Photodiode (APD) detector, a GaAs IC transimpedance preamplifier, and a thermistor in a mini-dil type package. 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 techniques.

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

Parameter	Symbol	Ratings	Unit
Storage Temperature	T_{stg}	-40 to +85	°C
Operating Case Temperature	T_{op}	-40 to +85	°C
Supply Voltage	V_{DD}	0 to +6.5	V
APD Reverse Voltage	V_R	0 to V_B	V
APD Reverse Current	$I_{R(Peak)}$	2	mA

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OPTICAL & ELECTRICAL CHARACTERISTICS
(T_C=25°C, λ=1.31/1.55μm, V_{DD}=+5.0V unless otherwise specified)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
APD Responsivity	R13	1,310nm, M=1	0.75	0.85	-	A/W
	R15	1,550nm, M=1	0.80	0.85	-	
APD Breakdown Voltage	V_B	I_D=10μA	40	50	65	V
Temperature Coefficient of V_B	Γ	(Note 2)	0.08	0.12	0.15	V/°C
AC Transimpedance	Zt	AC-Coupled, f=100MHz, RL=50Ω	-	2.0	-	kΩ
Bandwidth	BW	AC-Coupled, RL=50Ω, M=10, -3dBm from 1MHz	1.8	2.0	-	GHz
Equivalent Input Noise Current	in	AC-Coupled, RL=50Ω, Average in BW	-	8.0	9.0	pA/$\sqrt{Hz}$
Sensitivity	P_r	2.488Gb/s, NRZ, PRBS=2^{23}-1, B.E.R.=10^{-10}, Rext=13dB, VR is set at optimum value. Tc=25°C	-	-34.0	-32.0	dBm
		Tc=-40 to +85°C	-	-33.0	-31.0	
Maximum Overload	P_{o1}	(Note 3)	-7	-6	-	dBm
	P_{o2}	(Note 4)	-5	-4	-	
Optical Return Loss	ORL		30	-	-	dB
Power Supply Current	I_{DD}		-	-	70	mA
Power Supply Voltage	V_{DD}		4.75	5.0	5.25	V
Thermistor Resistance	R_{th}		9.5	10.0	10.5	kΩ
Thermistor B Constant	B		3800	3900	4000	K

Note: (1) Since VB may vary from device to device, VB data is attached to each device for reference.
(2) Γ=ΔVB/ΔTc.
(3) P_{o1} is defined by 10% distortion of the output waveform on the ground level in an AC-coupling condition at a multiplication factor (M) is 3.
(4) P_{o2} is defined as the maximum overload where the BER of 10^{-10} is maintained by changing only the VR condition to obtain M=3. The other conditions are the same as those of minimum sensitivity.

Fig. 1 APD Detector-Preamp response as a function of frequency with multiplication level as a parameter.

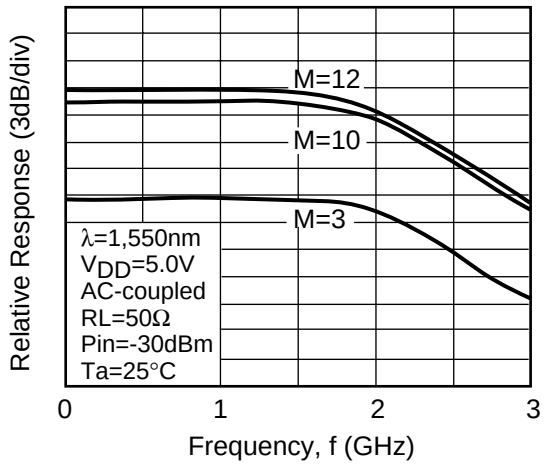


Fig. 2 Bit Error Rate at 1,550nm and a 2.488 Gb/s NRZ 2^{23-1} PRBS for various case temperatuires.

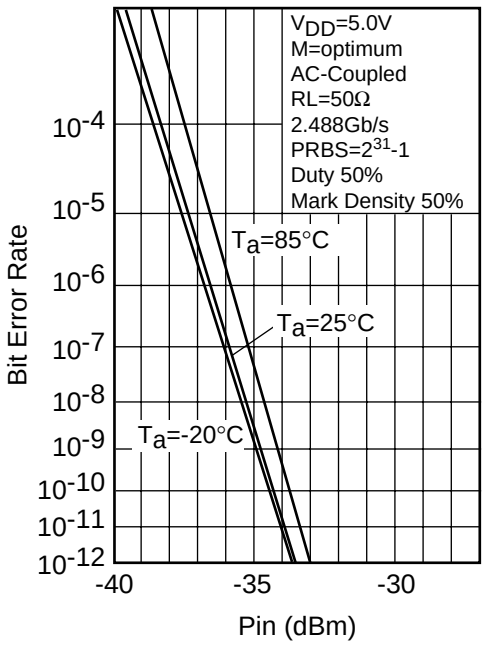
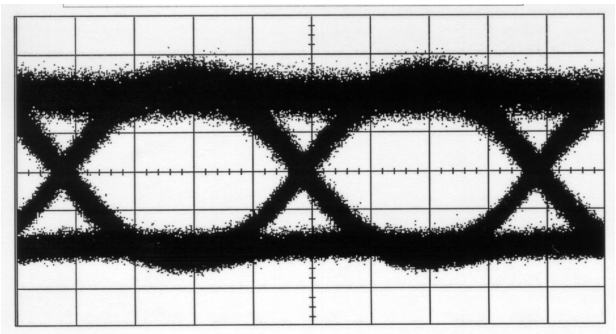
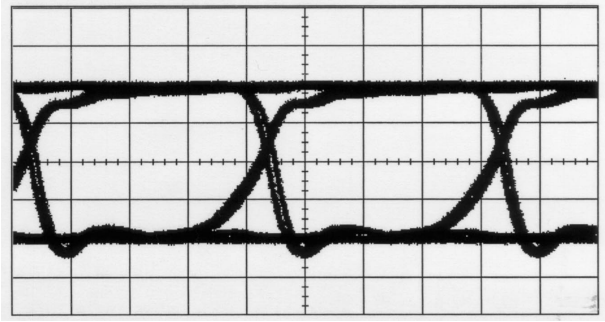


Fig. 3 Output Wave Form Tc=25°C, RL=50Ω, Pin=-30dBm, VDD=5.0V, M=12



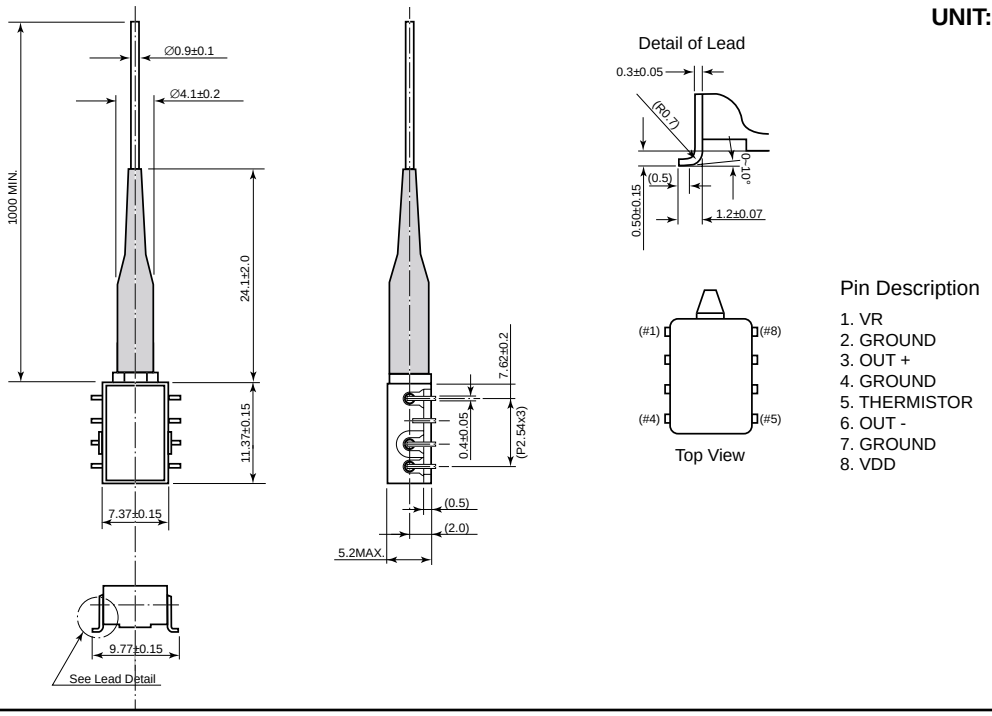
100psec/div

Fig. 4 Output Wave Form Tc=25°C, RL=50Ω Pin=-7dBm, VDD=-5.2V, M=3



100psec/div

"BS" PACKAGE **UNIT: mm**



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