

InGaAs-APD/Preamp_____ **FRM5W231KT/LT** **Receiver**

FEATURES

- Data rate up to 2.5Gb/s
- -32dBm typ. sensitivity
- 30 μ m active area APD chip with GaAs pre-amplifier
- Small co-axial package with single mode fiber

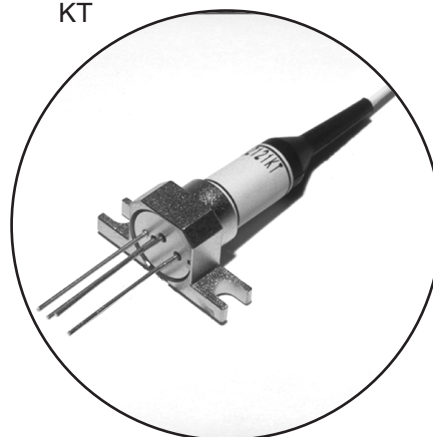
APPLICATIONS

- High bit rate long haul optical transmission systems operating at 2.5Gb/s

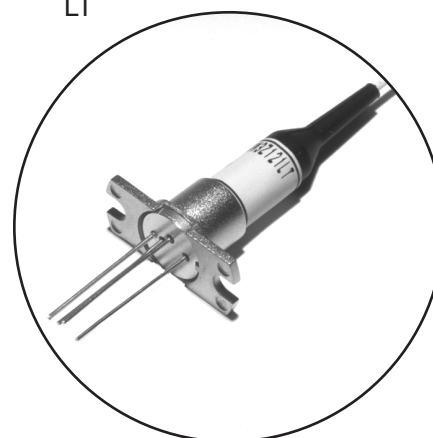
DESCRIPTION

These APD preamplifiers use an InGaAs APD chip with GaAs IC preamplifier. The KT package is designed for a horizontal PC board mount. The LT package is secured by a vertical flange. Each package is connected with single mode fiber by Nd: YAG welding. The detector preamplifier is DC coupled and has a low electrical output when the APD is illuminated.

KT



LT



ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Storage Temperature	T_{stg}	-40 to +85	$^\circ\text{C}$
Operating Temperature	T_{op}	-40 to +85	$^\circ\text{C}$
Supply Voltage	V_{SS}	-7 to 0	V
APD Reverse Voltage	V_{R} (Note 1)	0 to V_{B}	V
APD Reverse Current	I_{R} (Note 2)	0.6	mA

OPTICAL & ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, $\lambda=1,310/1,550\text{nm}$, $V_{\text{SS}}=-5.2\text{V}$, unless otherwise specified)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
APD Responsivity	R15	1,550nm, M=1	0.80	0.85	-	A/W
	R13	1,310nm, M=1	0.75	0.85	-	A/W
APD Breakdown Voltage	V_{B}	$I_{\text{D}}=10\mu\text{A}$	40	50	65	V
Temperature Coefficient of V_{B}	γ	Note 3	0.08	0.12	0.15	$\text{V}/^\circ\text{C}$
AC Transimpedance	Z_{t}	AC-Coupled, $f=100\text{MHz}$, $R_{\text{L}}=50\Omega$, $\text{Pin} < -20\text{dBm}$,	400	600	-	Ω
Bandwidth	BW	AC-Coupled, $R_{\text{L}}=50\Omega$, $M=3$ to 15, -3dBm from 1MHz	1.8	2.0	-	GHz
Equivalent Input Noise Current Density	i_{n}	AC-Coupled, $R_{\text{L}}=50\Omega$, Average within BW	-	6.5	8	$\text{pA}/\sqrt{\text{Hz}}$
Sensitivity	P_{r}	2.488Gb/s NRZ, PRBS= $2^{23}-1$, B.E.R.= 10^{-10} , V_{R} is set at optimum value	-	-32	-31	dBm
		$T_C=-40$ to $+85^\circ\text{C}$	-	-31	-30	dBm
Maximum Overload	P_{O}	2.488Gb/s NRZ, M=3, PRBS= $2^{23}-1$, B.E.R.= 10^{-10} , V_{R} is set at optimum value	-5	-	-	dBm
		$T_C=-40$ to $+85^\circ\text{C}$, M=3	-7	-	-	dBm
Power Supply Current	I_{SS}	-	-	-	40	mA
Power Supply Voltage	V_{SS}	-	-5.46	-5.2	-4.94	V

Note: (1) V_{B} differs from device to device. V_{B} data is attached to each devices.

(2) CW condition

(3) $\gamma=dV_{\text{B}}/dT_C$

Fig. 1 Output Characteristics

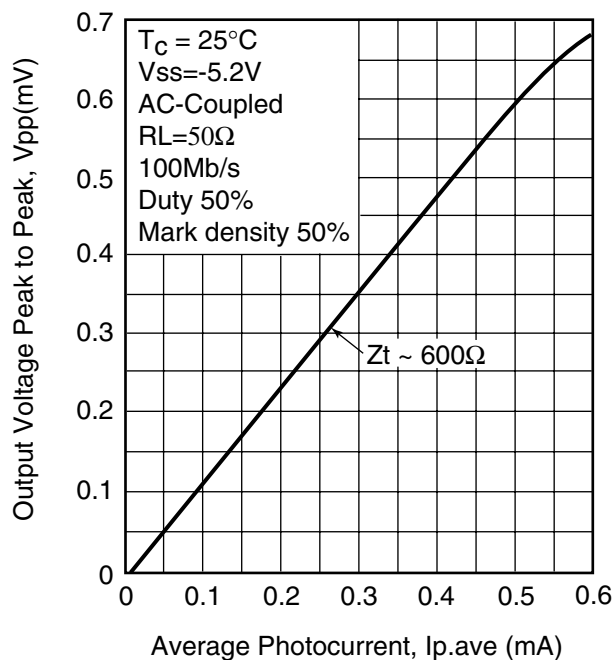


Fig. 2 Relative Frequency Response

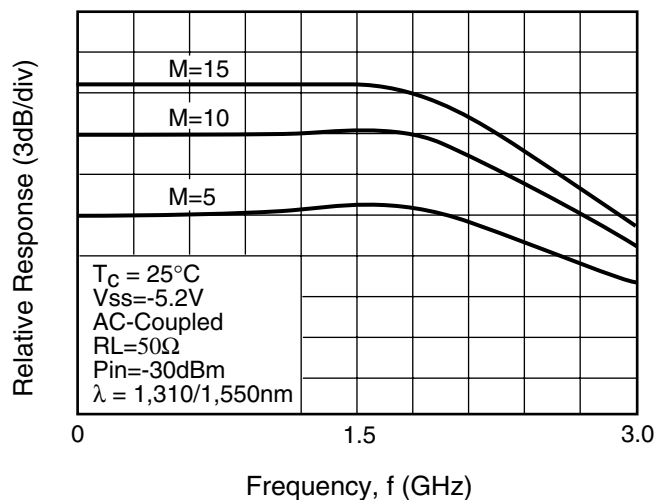
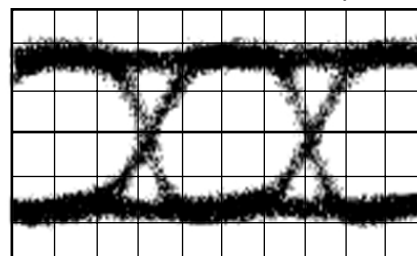


Fig.4 Eye Diagram with a 1,550nm, 2.5Gb/s NRZ, $2^{23}-1$ PRBS incident signal

Input optical wave form with Bessel filter



Equivalent output wave form at $P_{in} = -32\text{dBm}$, $T_C = 25^\circ\text{C}$, $M = \text{optimum}$



100ps/div

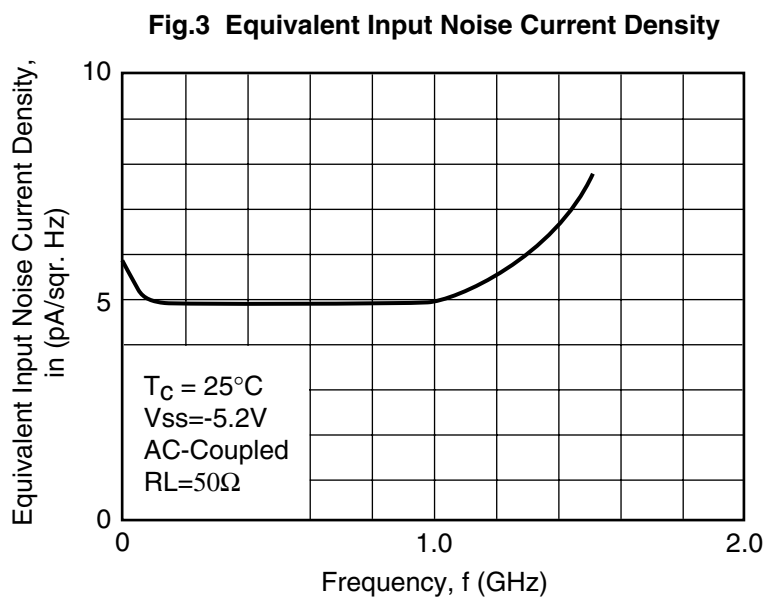
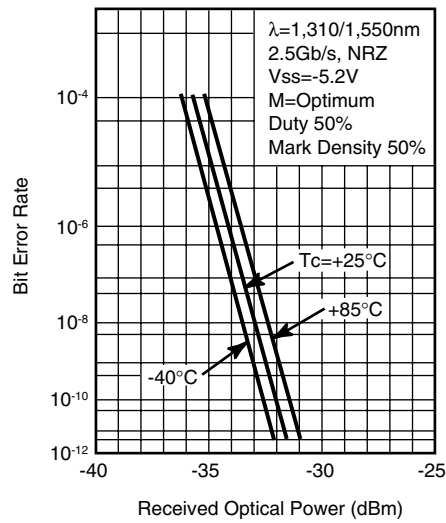
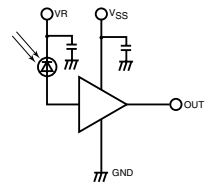
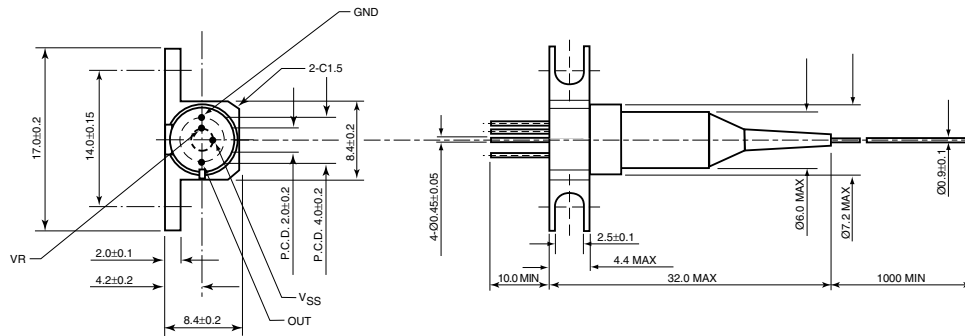


Fig.5 Bit Error Rate



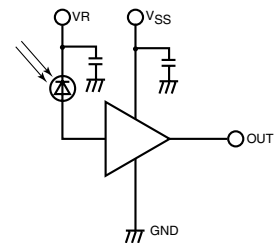
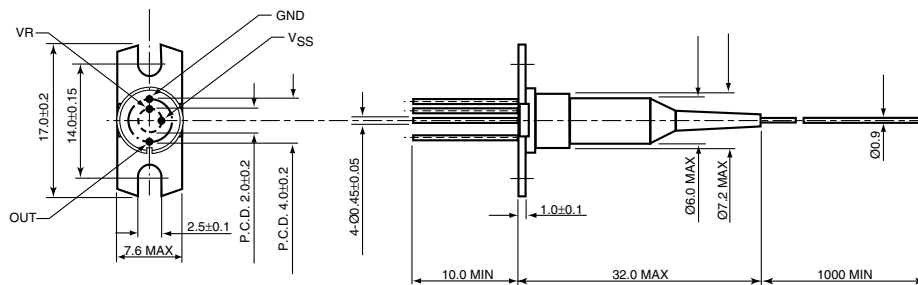
"KT" PACKAGE

UNIT: mm



"LT" PACKAGE

UNIT: mm



InGaAs-APD/Preamp Receiver _____ **FRM5W231KT/LT**

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