

**FEATURES**

- Data rate up to 622Mb/s
- High Responsibility: typ. 0.85A/W at 1,550nm
- 30µm active area APD chip with GaAs pre-amplifier
- High temperature operation up to +85°C
- Small co-axial package with single mode fiber

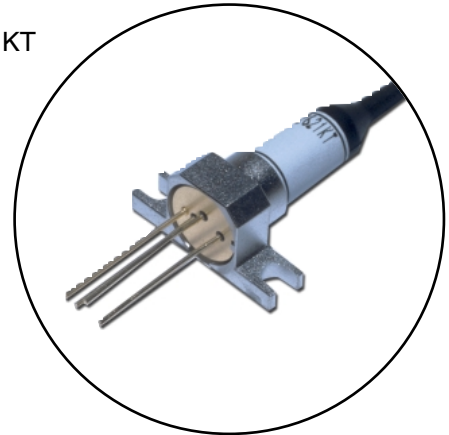
**APPLICATIONS**

- Medium bit rate long haul optical transmission systems at STM-4 (OC-12)

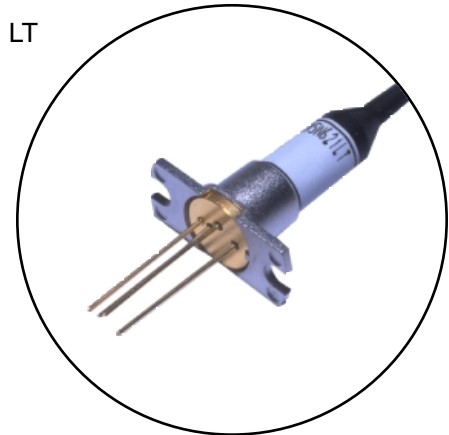
**DESCRIPTION**

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<sub>C</sub>=25°C)

Parameter	Symbol	Ratings	Unit
Storage Temperature	T <sub>stg</sub>	-40 to +85	°C
Operating Temperature	T <sub>op</sub>	-40 to +85	°C
Supply Voltage	V <sub>SS</sub>	-7 to 0	V
APD Supply Voltage	V <sub>R</sub> (Note 1)	0 to V <sub>B</sub>	V
APD Reverse Current	I <sub>R</sub> (Note 2)	1.0	mA

OPTICAL & ELECTRICAL CHARACTERISTICS (T<sub>C</sub>=25°C, λ=1,310/1,550nm, V<sub>SS</sub>=-5.2V, unless otherwise specified)

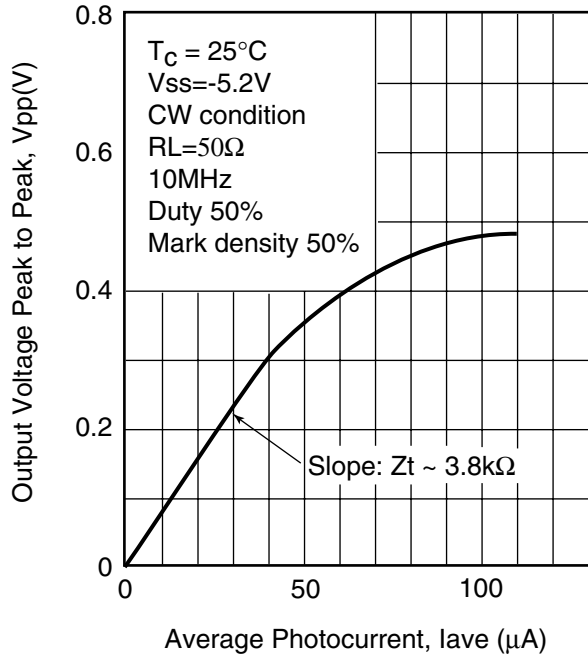
Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
APD Responsivity	R15	1,550nm, M=1	0.80	0.85	-	A/W
	R13	1,310nm, M=1	0.75	0.85	-	A/W
APD Breakdown Voltage	V <sub>B</sub>	I <sub>D</sub> =10μA	40	50	70	V
Temperature Coefficient of V <sub>B</sub>	γ	(Note 3)	0.08	0.12	0.15	V/°C
AC Transimpedance	Z <sub>t</sub>	AC-Coupled, f=10MHz, R <sub>L</sub> =50Ω, P <sub>in</sub> <=-20dBm,	3.0	3.8	-	kΩ
Bandwidth	BW	AC-Coupled, R <sub>L</sub> =50Ω, M=3 to 15, -3dBm from 1MHz	467	550	-	MHz
Equivalent Input Noise Current Density	i <sub>n</sub>	AC-Coupled, R <sub>L</sub> =50Ω, Average within BW	-	2.64	3.2	pA/√Hz
Sensitivity	P <sub>r</sub>	622Mb/s NRZ, PRBS=2 <sup>23</sup> -1, B.E.R.=10 <sup>-10</sup> , V <sub>R</sub> is set at optimum value	-	-42	-40	dBm
		T <sub>c</sub> =-40 to +85°C	-	-41	-39	dBm
Maximum Overload	P <sub>o</sub>	622Mb/s NRZ, M=3, PRBS=2 <sup>23</sup> -1, B.E.R.=10 <sup>-10</sup> , V <sub>R</sub> is set at optimum value	-5	-	-	dBm
		T <sub>c</sub> =-40 to +85°C, M=3	-7	-	-	dBm
Power Supply Current	I <sub>SS</sub>	-	-	-	40	mA
Power Supply Voltage	V <sub>SS</sub>	-	-5.46	-5.2	-4.94	V

Note: (1) V<sub>B</sub> differs from device to device. V<sub>B</sub> data is attached to each device.

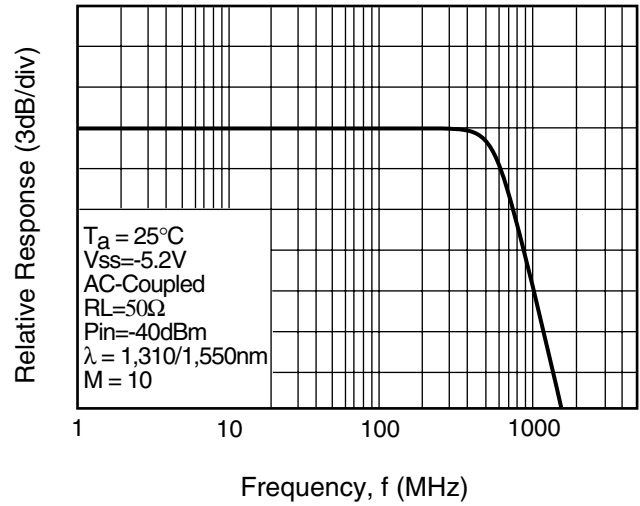
(2) CW condition

(3) γ=dV<sub>B</sub>/dT<sub>C</sub>

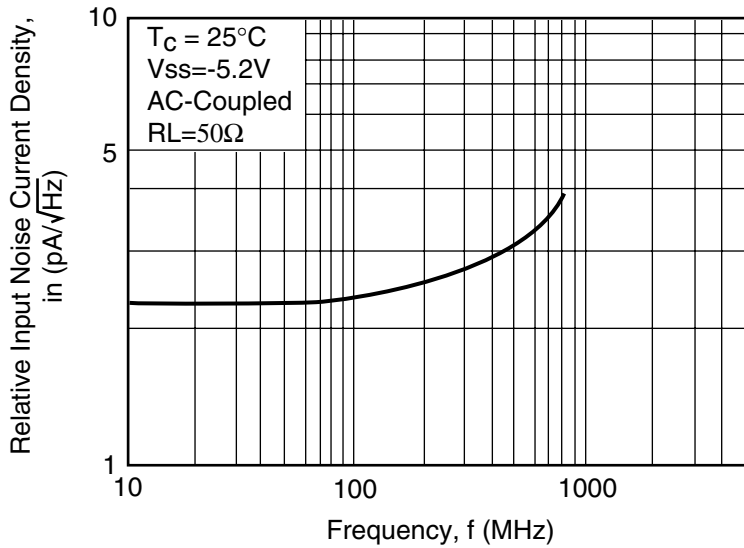
**Fig. 1 Output Characteristics**



**Fig. 2 Relative Frequency Response**

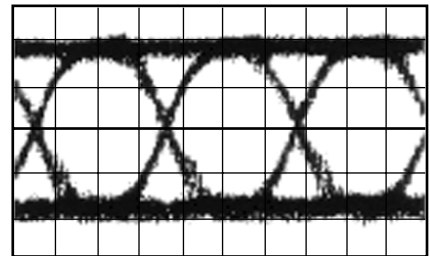


**Fig.3 Equivalent Input Noise Current Density**

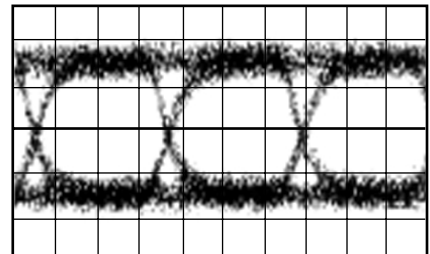


**Fig.4 Eye Diagram with a 1,550nm, 622Mb/s NRZ,  $2^{23}-1$  PRBS incident signal**

Input optical wave form with Bessel filter

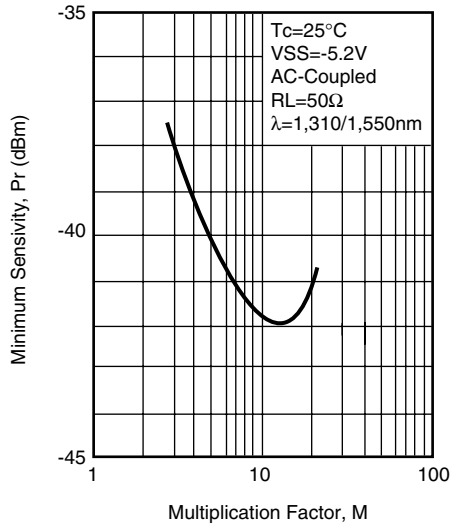


Equivalent output wave form at  $P_{in} = -42\text{dBm}$ ,  $T_c = 25^\circ\text{C}$ ,  $M = \text{optimum}$

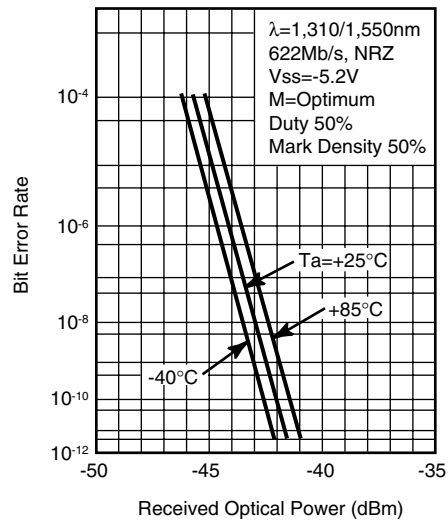


500ps/div

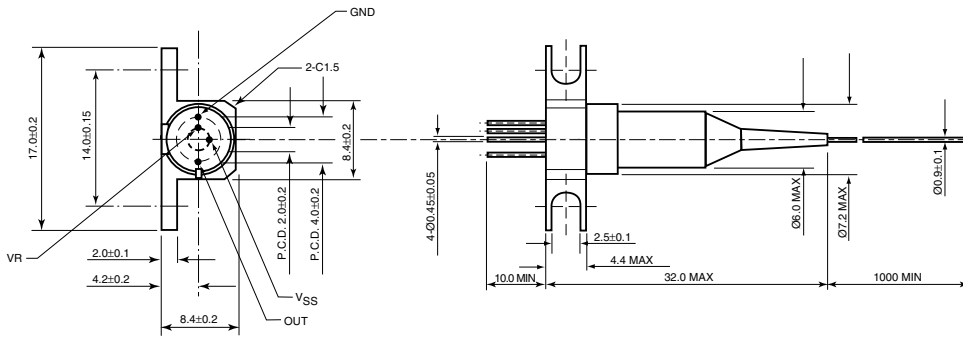
**Fig.5 Sensitivity**



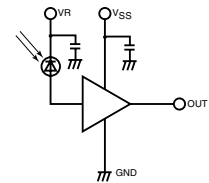
**Fig.6 Bit Error Rate**



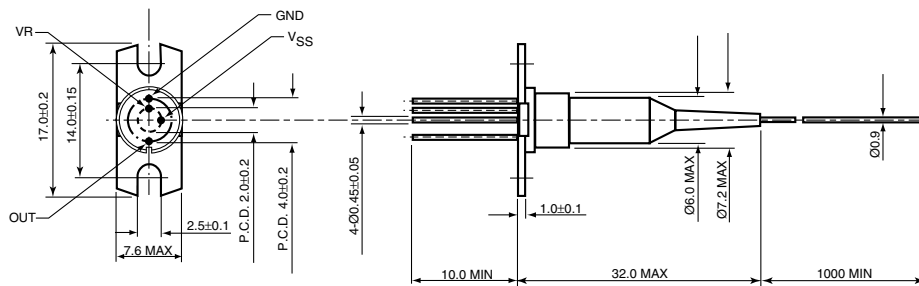
**“KT” PACKAGE**



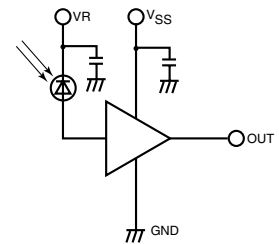
UNIT: mm



**“LT” PACKAGE**



UNIT: mm



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# **InGaAs-APD/Preamp** \_\_\_\_\_ **FRM5W621KT/LT**

## **Receiver**

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