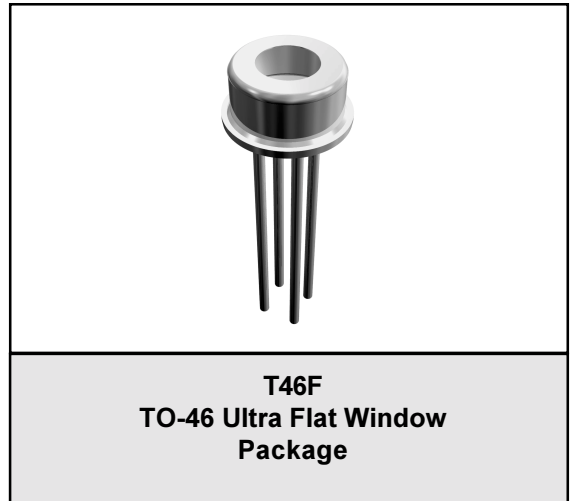


**FEATURES**

- 1.25 Gb/s Differential Output TIA
- 5V Operation
- Automatic Gain Control
- 850nm Photodetector with  
100  $\mu\text{m}$  x 100  $\mu\text{m}$  Active Area
- Integrated MSM detector & TIA
- TO-46 Ultra Flat Window

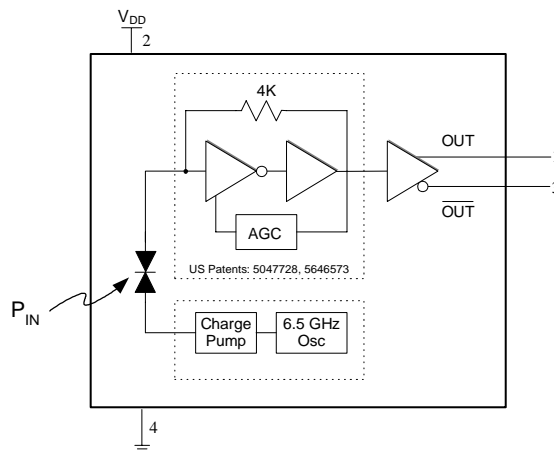
**APPLICATIONS**

- Gigabit Ethernet (1.250Gb/s)
- Fibre Channel (1.0625 Gb/s)


**Product Description**

The ANADIGICS AMT128502A is a 5V monolithically integrated Metal-Semiconductor-Metal (MSM) photodetector and transimpedance amplifier (TIA) used to convert an 850nm input optical signal into a differential output voltage, and is manufactured in ANADIGICS' 6" GaAs wafer fabrication facility. The integrated MSM and TIA receiver maximizes the receiver performance by minimizing the photodetector input parasitics to the TIA and

internally biasing the photodetector to achieve high sensitivity, bandwidth and overload performance. As an integrated product the reliability is inherently better than a discrete solution, and both the MSM-TIA integrated circuit and TO46 flat window packaged receiver pass stringent reliability requirements. These products are readily designed into receivers and transceivers for Gigabit Ethernet and Fibre Channel applications.

**Figure 1: AMT128502A Equivalent Circuit**


**Table 1: Absolute Maximum Ratings**

$V_{DD}$	7.0 V
$P_{IN}$	+ 5 dBm
$T_S$	Storage Temp. - 65 °C to 125 °C

**Table 2: Electrical Characteristics**

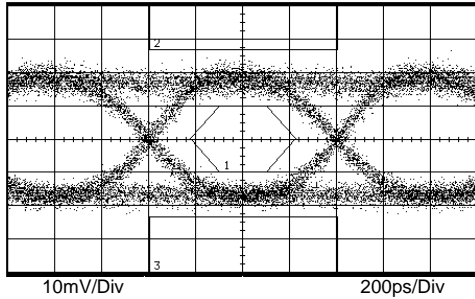
PARAMETER	MIN	TYP	MAX	UNIT
Wavelength ( $\lambda$ )	770	850	860	nm
Detector Active Area	-	100 x 100	-	$\mu\text{m}^2$
Small Signal Differential Responsivity <sup>(1)</sup> (@50 MHz)	1000	-	-	V / W
Bandwidth <sup>(1)</sup>	1000	-	1500	MHz
Low Frequency Cutoff	-	300	1000	kHz
Output Resistance	25	40	60	Ohm
Optical Overload <sup>(2)</sup>	0	-	-	dBm
Optical Sensitivity <sup>(2)</sup>	-20	- 22	-	dBm
Differential Output Voltage <sup>(3), (4)</sup>	-	700	-	mV
$T_{RISE}$ & $T_{FALL}$ (20 - 80%) <sup>(3), (4)</sup>	-	260	-	ps
Duty Cycle Distortion <sup>(3), (5)</sup>	-	4	10	%
RMS Jitter <sup>(3), (5), (6)</sup>	-	15	-	ps
Total Jitter (pk-pk) <sup>(3), (5), (7)</sup>	-	90	-	ps
Supply Current	-	-	50	mA
Operating Voltage Range	+ 4.5	+5.0	+5.5	V
Operating Ambient Temperature Range	0	-	70	°C

- (1) Measured at -14 dBm optical input power with output connected into  $R_L = 100\Omega$  (differential)
- (2) Measured at  $10^{-10}$  BER with a  $2^7-1$  PRBS at 1.25 GB/s
- (3) Input optical power = -3 dBm,  $R_L = 100\Omega$  (differential).
- (4) Measured with a 625 MHz, 50% duty cycle square wave.
- (5) Measured with a 1.25 Gb/s,  $2^7-1$  PRBS.
- (6)  $1\sigma$  about the center eye crossing.
- (7)  $6\sigma$  about the center eye crossing.

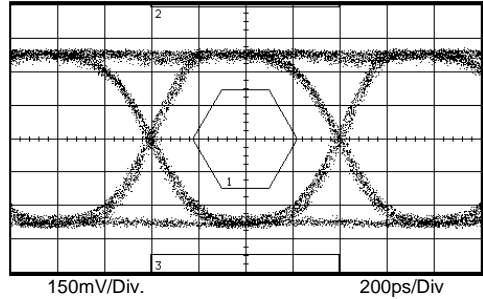
**Table 3: Package Pin Description**

PIN	Description	Comment
1	$V_{OUT}$ - TIA Output Voltage (non- inverted)	Logical '1' with optical input
2	$V_{DD}$ - Positive Supply Voltage	+ 5 Volts
3	$\overline{V_{OUT}}$ - TIA Output Voltage (inverted)	Logical '0' with optical input
4	Ground	Case is grounded

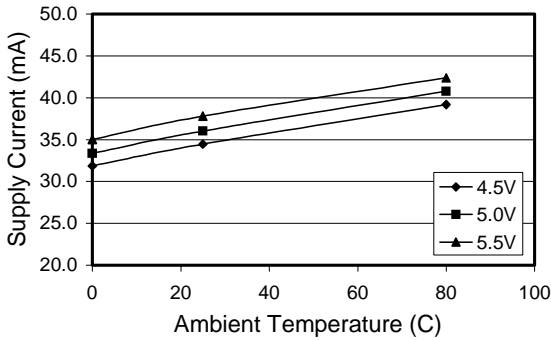
**Figure 2: Eye Diagram with an Optical Input Power of -17dBm**



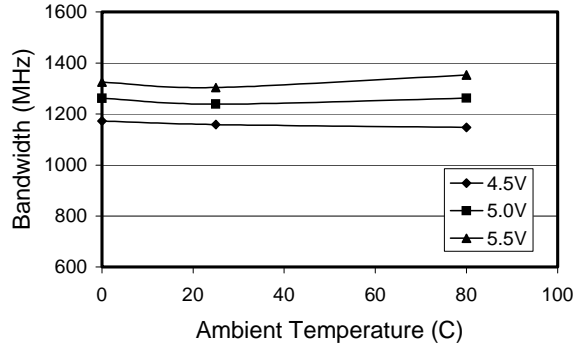
**Figure 3: Eye Diagram with an Optical Input Power of -1.0dBm**



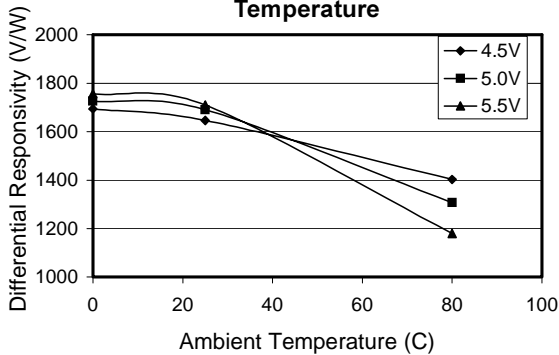
**Figure 4: Supply Current vs. Temperature**



**Figure 5: Bandwidth vs. Temperature**



**Figure 6: Differential Responsivity vs. Temperature**



**Figure 7: Sensitivity vs. Temperature**

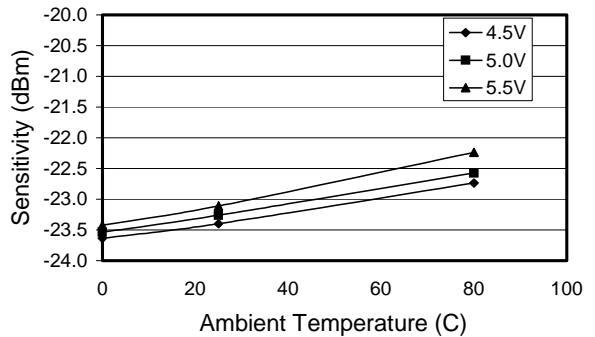


Figure 8: Test Setup for Frequency Response

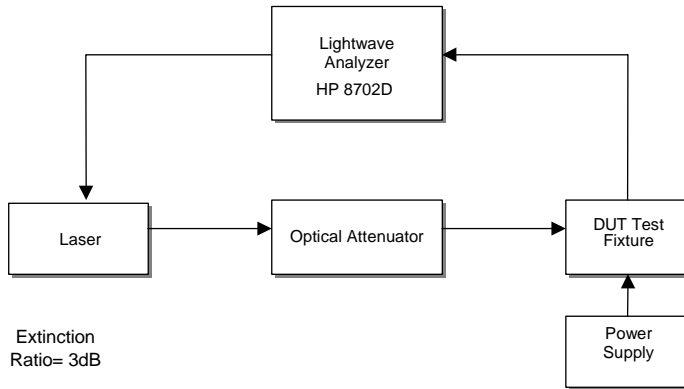


Figure 9: Test Setup for Sensitivity

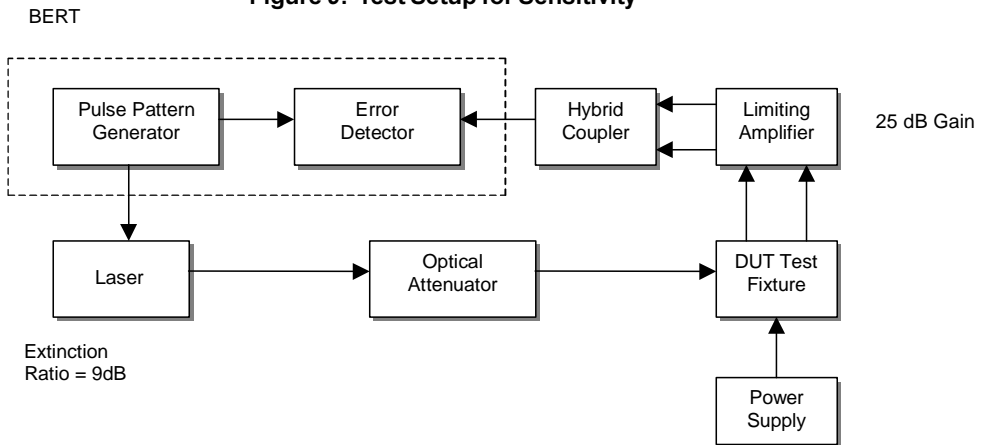


Figure 10: Test Setup for Eye Measurements

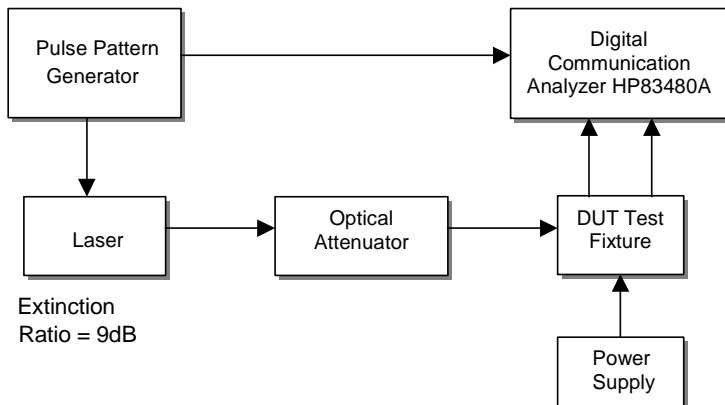


Figure 11: DUT Test Fixture Schematic

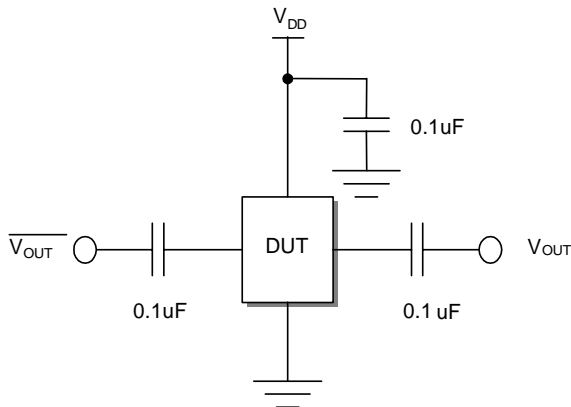
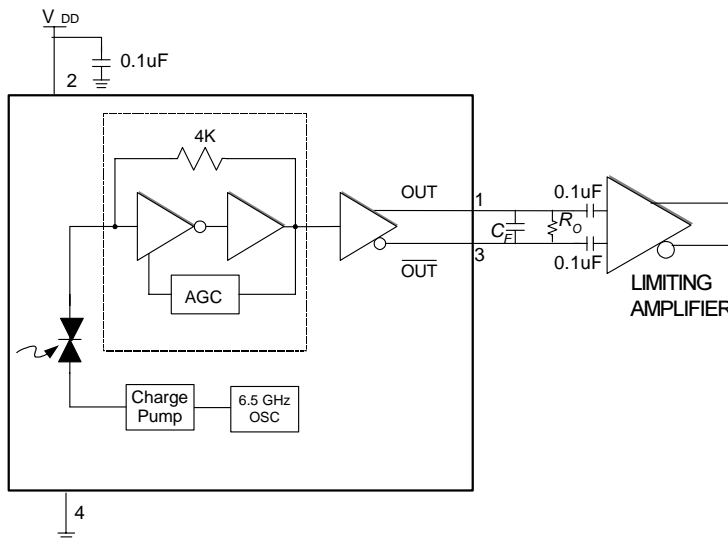


Figure 12: Application Schematic



$C_F$  is an optional single pole noise filter

$$C_F = \frac{1}{2\pi f_c R}$$

$f_c$  is the desired cutoff frequency

$$R = 50 \Omega$$

$R_o$  is required with high input resistance limiting amplifiers

$$R_o = 100 \Omega$$

Figure 13: Evaluation Board Schematic

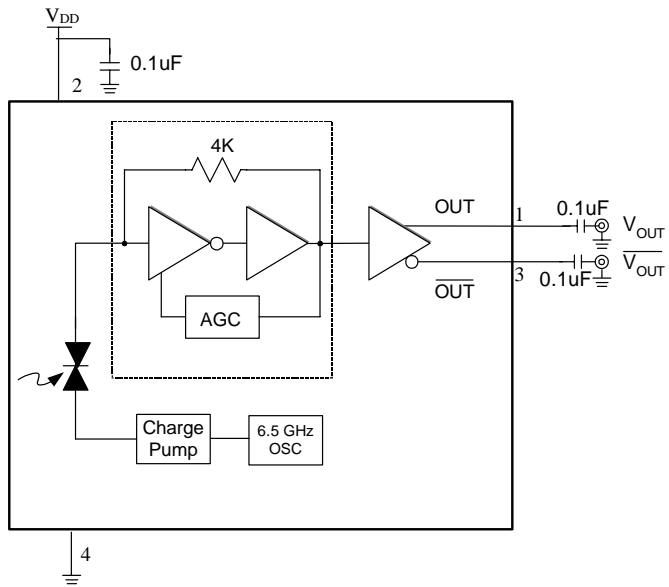


Figure 14: Evaluation Board Layout

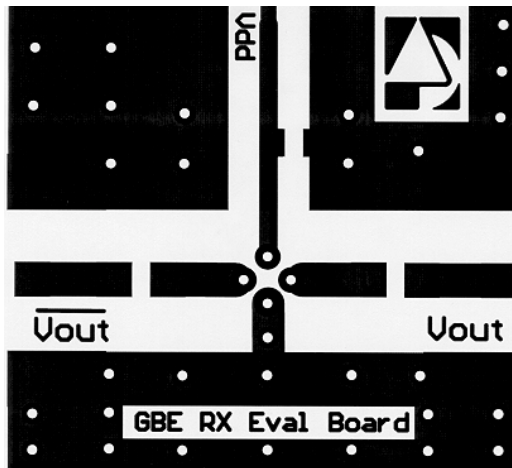
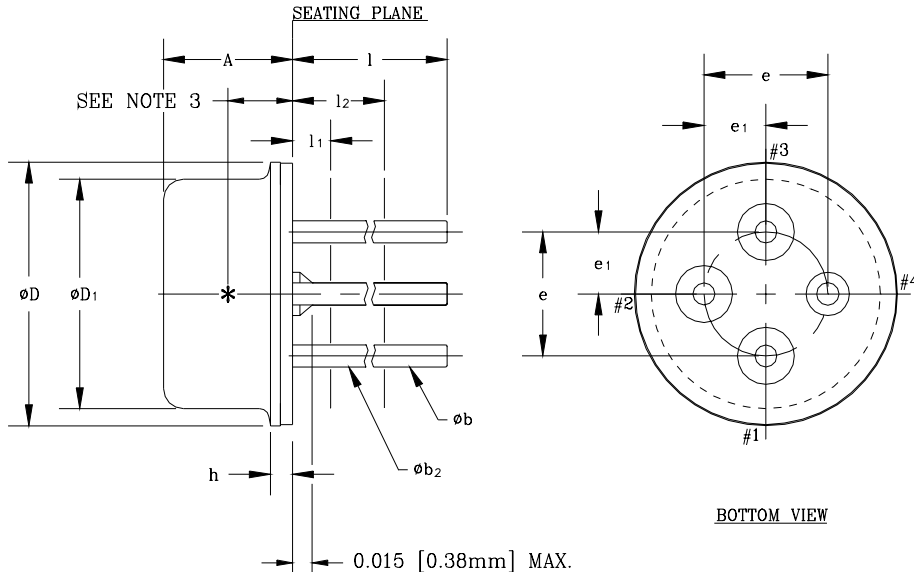


Figure 15: T46F Package Outline Diagram



MM CONTROLLING DIMENSIONS

S <sub>V</sub> M <sub>B</sub> O <sub>L</sub>	INCHES		MILLIMETERS		NOTE
	MIN.	MAX.	MIN.	MAX.	
A	0.098	0.110	2.50	2.80	
φb	0.016	0.020	0.41	0.51	1
φb <sub>2</sub>	0.012	0.019	0.30	0.48	1
φD	0.212	0.218	5.38	5.54	
φD <sub>1</sub>	0.181	0.187	4.60	4.75	
e	0.100	T.P.	2.54	T.P.	2
e <sub>1</sub>	0.050	T.P.	1.27	T.P.	2
h	0.014	0.022	0.36	0.56	
l	0.500	0.540	12.70	13.70	1
l <sub>1</sub>	-	0.050	-	1.27	1
l <sub>2</sub>	0.250	-	6.35	-	1

NOTES:

- (FOUR LEADS) φb<sub>2</sub> APPLIES BETWEEN l<sub>1</sub> AND l<sub>2</sub>. φb APPLIES BETWEEN l<sub>2</sub> AND 0.5 [12.70mm] FROM SEATING PLANE. DIAMETER IS UNCONTROLLED IN l<sub>1</sub> AND BEYOND 0.5 [12.70mm] TO END OF PIN.
- MAXIMUM DIAMETER LEADS AT A GAGING PLANE 0.054 [1.37mm]+0.001 [0.025mm] -0.000 [0.000mm] BELOW SEATING PLANE TO BE WITHIN 0.007 [0.178mm] OF THEIR TRUE POSITION RELATIVE TO MAXIMUM-WIDTH TAB AND TO THE MAXIMUM 0.212 [5.40mm] DIAMETER MEASURED WITH A SUITABLE GAGE. WHEN GAGE IS NOT USED, MEASUREMENT WILL BE MADE AT 0.250 [6.35mm] FROM SEATING PLANE.
- INTERNAL OPTICAL HEIGHT = 0.052±0.003[1.31±.08]
- BENT LEADS SHOULD NOT EXTEND OUTSIDE DIAMETER (φD) OF CAP OR TOUCH EACH OTHER.
- ALL DIMENSIONS ARE REFERENCE ONLY-EXCEPT A, D & h.
- DETECTOR DIODE PLACEMENT ACCURACY: ⊕0.15MM[0.006] WITH RESPECT TO CENTER OF HEADER.(REF.ONLY)

**Ordering Information**

<b>Part Number</b>	<b>Package Option</b>	<b>Package Description</b>
AMT128502AT46F	TO-46F	Ultra Flat Window



**ANADIGICS, Inc.**

141 Mount Bethel Road

Warren, New Jersey 07059, U.S.A

Tel: +1 (908) 668-5000

Fax: +1 (908) 668-5132

<http://www.anadigics.com>

[Mktg@anadigics.com](mailto:Mktg@anadigics.com)

**IMPORTANT NOTICE**

ANADIGICS, Inc. reserves the right to make changes to its products or discontinue any product at any time without notice. The Advanced Product data sheets and product specifications contained in this data sheet are subject to change prior to a products formal introduction. The information in this data sheet has been carefully checked and is assumed to be reliable. However, ANADIGICS assumes no responsibility for inaccuracies. ANADIGICS strongly urges customers to verify that the information they are using is current before placing orders.

**WARNING**

ANADIGICS products are not intended for use in life support appliances, devices, or systems. Use of an ANADIGICS product in any such application without written consent is prohibited.