

FEATURES

- 2.5 Gb/s Differential Output TIA
- 3.3 V Operation
- Automatic Gain Control
- 55 μm 1270-1560 nm PIN Photodetector
- 2000 MHz Bandwidth
- -23 dBm Typical Sensitivity
- +2 dBm Optical Overload
- TO-46 Lens Package

APPLICATIONS

- SONET OC-48/SDH STM-16 (2.488 Gb/s)
- 2 x Fibre Channel (2.125 Gb/s)
- 2.5 Gb/s Infiniband



PRODUCT DESCRIPTION

The ANADIGICS AMT8410, packaged in a TO46 lens can, is a 3.3 V integrated photodetector and transimpedance amplifier (TIA) used to convert a long wavelength (1270 to 1560 nm) input optical signal into a differential output voltage. The

AMT8410 has a bandwidth of 2000 MHz and a dynamic range of 25 dB. These devices are readily designed into receivers, transceivers and transponders for SONET, Fibre Channel and Infiniband applications.

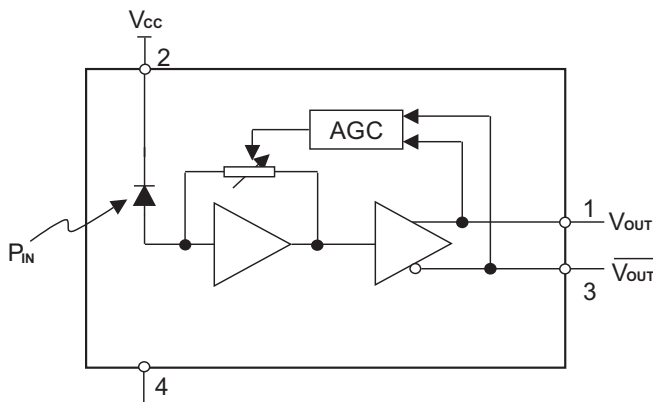


Figure 1: Funtional Block Diagram

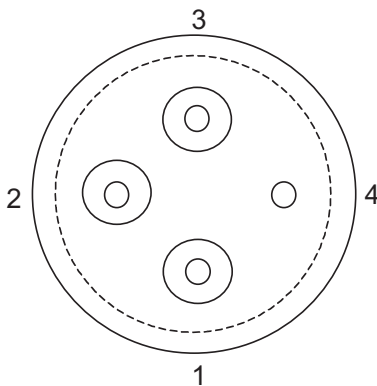


Figure 2: T46L Pinout (Bottom View)

Table 1: Pin Description

| PIN | DESCRIPTION | COMMENT |
|-----|--|--------------------------------|
| 1 | V_{OUT} - TIA Output Voltage (Non-Inverted) | Logical '1' with optical input |
| 2 | V_{CC} - Positive Supply Voltage | +3.3 Volts |
| 3 | $\overline{V_{OUT}}$ - TIA Output Voltage (Inverted) | Logical '0' with optical input |
| 4 | Ground | Case is grounded |

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Maximum Ratings

| | |
|-----------------|--------------------------------|
| V _{CC} | 6.0 V |
| P _{IN} | +4 dBm |
| T _s | Storage Temp. -65 °C to 125 °C |

Stresses in excess of the absolute ratings may cause permanent damage. Functional operation is not implied under these conditions. Exposure to absolute ratings for extended periods of time may adversely affect reliability.

Table 3: Electrical Specifications

| PARAMETER | MIN | TYP | MAX | UNIT |
|---|------|------|------|---------------|
| Wavelength (λ) | 1270 | 1300 | 1560 | nm |
| Detector Active Area | - | 55 | - | μm |
| Small Signal Differential Responsivity (@ 100 MHz) ⁽¹⁾ | 1700 | 2000 | - | V/W |
| Bandwidth ⁽¹⁾ | 1700 | 2000 | - | MHz |
| Low Frequency Cutoff | - | 100 | - | kHz |
| Output Resistance | - | 50 | - | Ω |
| Optical Overload ⁽²⁾ | 0 | +2 | - | dBm |
| Optical Sensitivity ⁽²⁾ | -21 | -23 | - | dBm |
| Maximum Differential Output Voltage | - | - | 300 | mV |
| T _{RISE} & T _{FALL} (20 - 80%) ⁽³⁾ | - | 160 | - | ps |
| Duty Cycle Distortion ⁽⁴⁾ | - | 6 | - | % |
| Total Jitter ^{(4), (5)} | - | 45 | - | ps |
| Supply Current | - | 55 | 100 | mA |
| Operating Voltage Range | +3.0 | +3.3 | +3.6 | V |
| Operating Temperature Range | -40 | - | +85 | °C |

Notes:

(1) Measured at -17 dBm optical input power with output connected into $R_L = 100 \Omega$ (differential).

(2) Measured at 10^{-10} BER with a $2^{23}-1$ PRBS at 2.5 Gb/s.

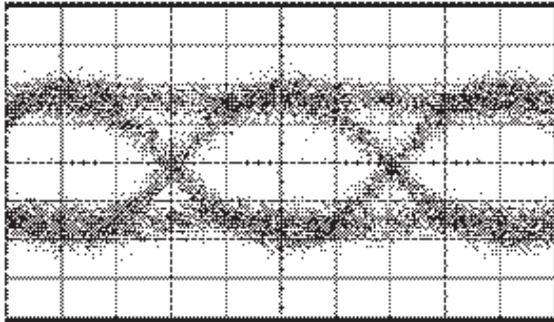
(3) Measured with a $2^{23}-1$ PRBS at 2.5Gb/s, an input optical power of -17dBm and $R_L = 100 \Omega$ (differential).

(4) Measured with a $2^{23}-1$ PRBS at 2.5Gb/s, an input optical power of -3dBm and $R_L = 100 \Omega$ (differential).

(5) 6σ about the center eye crossing.

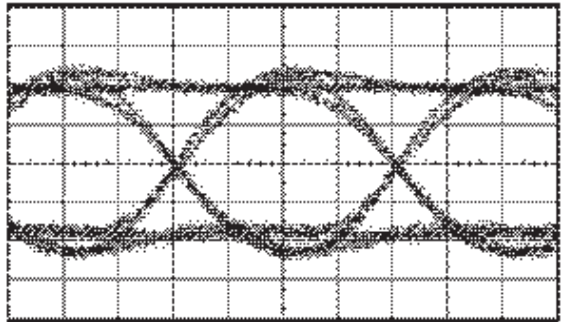
PERFORMANCE DATA

Figure 3: Eye Diagram with an Optical Input Power of -23 dBm



100 ps/Div. 5 mV/Div.

Figure 4: Eye Diagram with an Optical Input Power of -15 dBm



100 ps/Div. 25 mV/Div.

Figure 5: Supply Current vs. Case Temperature

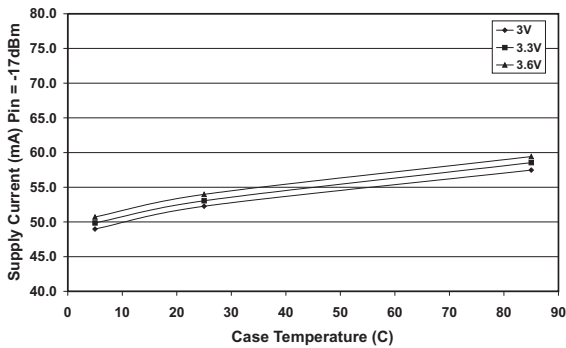


Figure 6: Bandwidth vs. Case Temperature

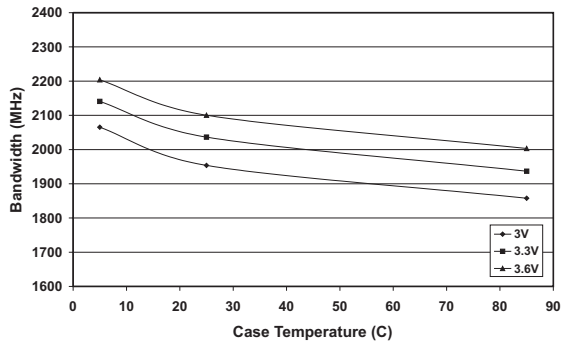


Figure 7: Differential Responsivity vs. Case Temperature

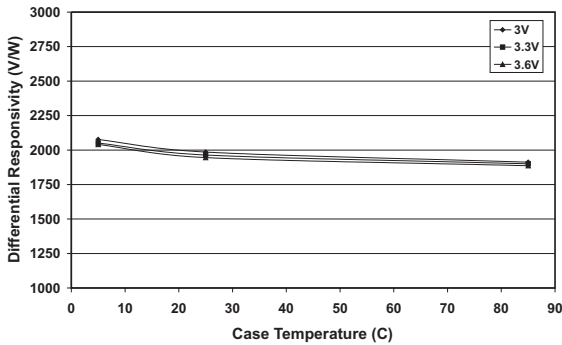
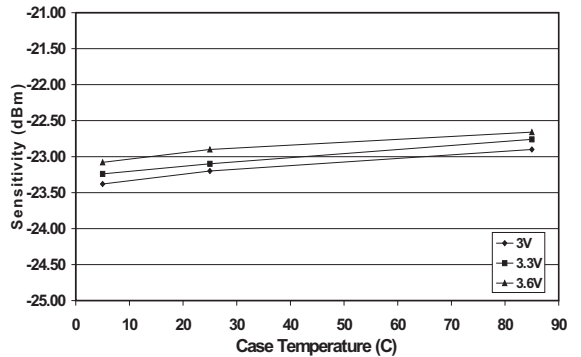


Figure 8: Sensitivity vs. Case Temperature



MEASUREMENT METHODS

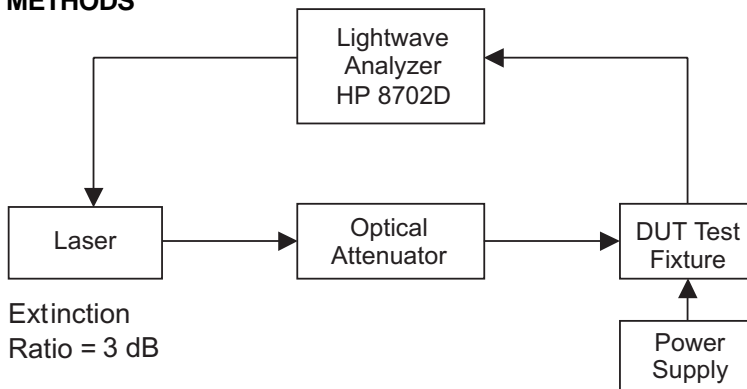


Figure 9: Test Setup for Frequency Measurements

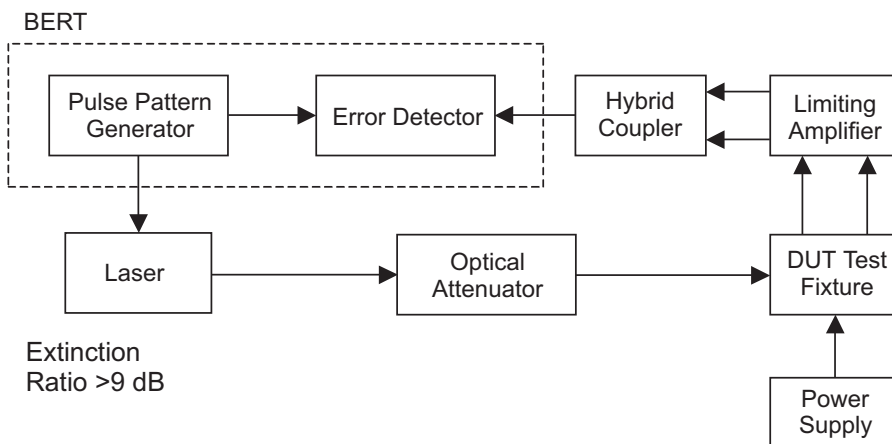


Figure 10: Test Setup for Sensitivity Measurements

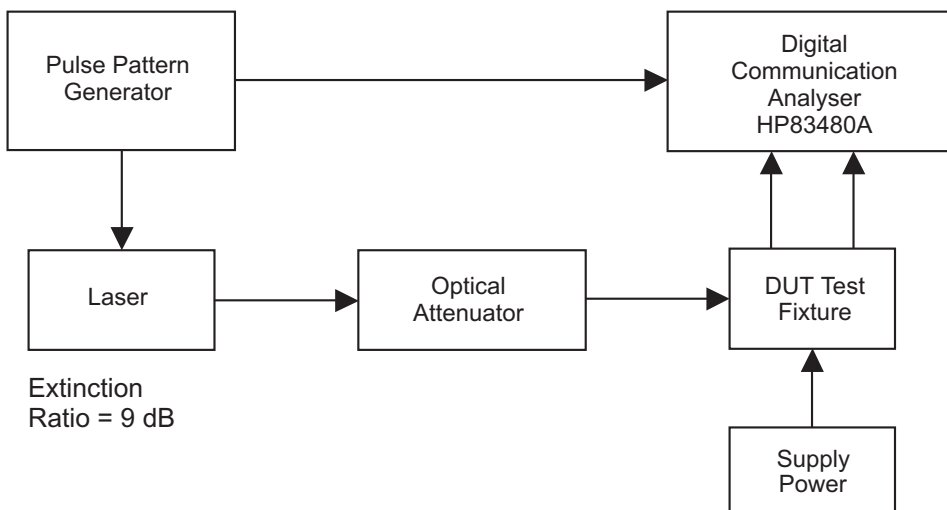


Figure 11: Test Setup for Eye Measurements

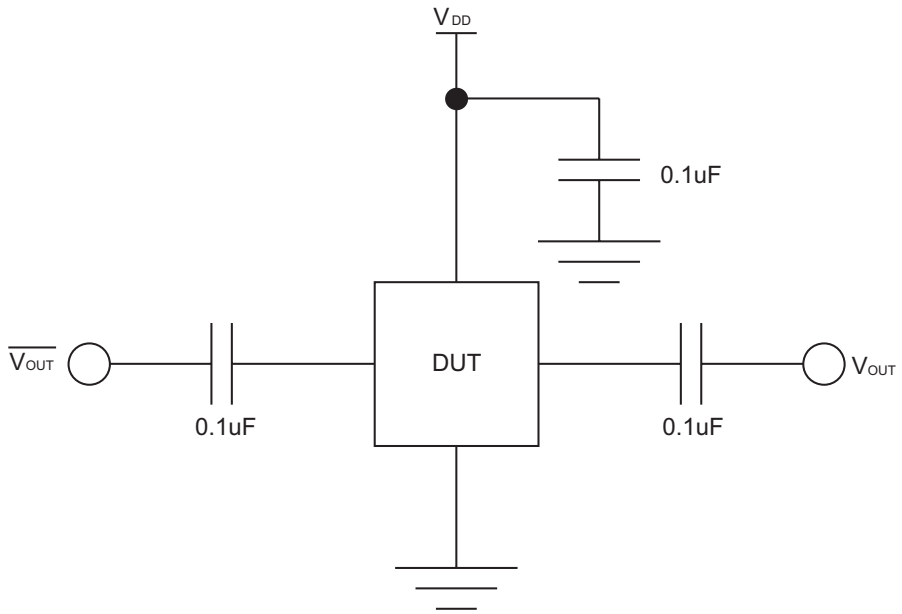
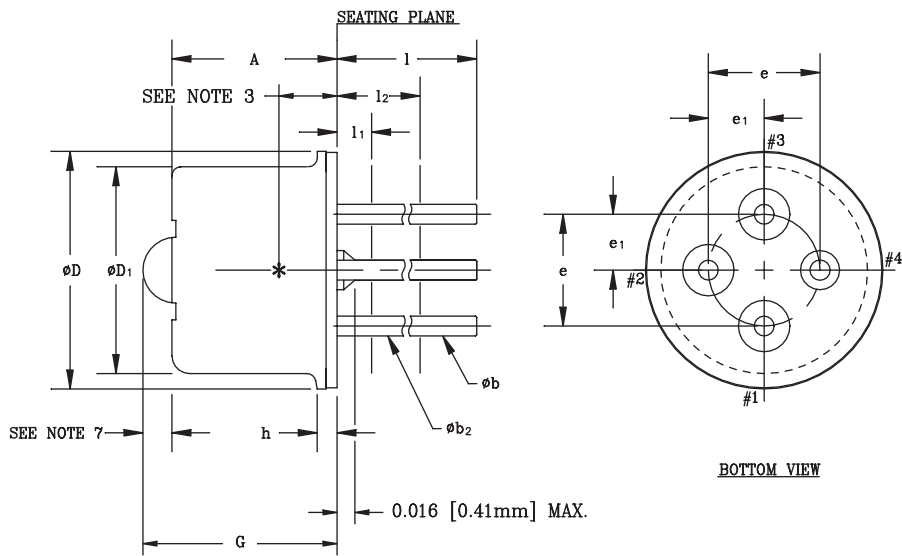


Figure 12: DUT Test Fixture Schematic

PACKAGE OUTLINE



MM CONTROLLING DIMENSIONS

| SYMBOL | INCHES | | MILLIMETERS | | NOTE |
|--------|--------|-------|-------------|-------|------|
| | MIN. | MAX. | MIN. | MAX. | |
| A | -- | 0.160 | -- | 4.00 | |
| øb | 0.016 | 0.020 | 0.41 | 0.51 | 1 |
| øb2 | 0.012 | 0.019 | 0.30 | 0.48 | 1 |
| øD | 0.212 | 0.218 | 5.38 | 5.54 | |
| øD1 | 0.181 | 0.187 | 4.60 | 4.75 | |
| e | 0.100 | T.P. | 2.54 | T.P. | 2 |
| e1 | 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 |
| l1 | -- | 0.050 | -- | 1.27 | 1 |
| l2 | 0.250 | -- | 6.35 | -- | 1 |
| G | -- | 0.190 | -- | 4.66 | 7 |

NOTES:

- (FOUR LEADS) øb2 APPLIES BETWEEN l1 AND l2. øb APPLIES BETWEEN l2 AND 0.5 [12.70mm] FROM SEATING PLANE; DIAMETER IS UNCONTROLLED IN l1 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 = 0.065±0.005[1.65±0.1]
- BENT LEADS SHOULD NOT EXTEND OUTSIDE DIAMETER (øD) OF CAP OR TOUCH EACH OTHER.
- ALL DIMENSIONS ARE REFERENCE ONLY—EXCEPT A, D & h.
- DETECTOR DIODE PLACEMENT ACCURACY: $\pm 0.15\text{MM}[0.006]$ WITH RESPECT TO CENTER OF HEADER; REFERENCE ONLY
- LENS HEIGHT = 0.65±0.1 [0.026±0.004]

Figure 13: T46L Package Outline Diagram

ORDERING INFORMATION

| ORDER NUMBER | TEMPERATURE RANGE | PACKAGE DESCRIPTION | COMPONENT PACKAGING |
|---------------------|--------------------------|-----------------------------|----------------------------|
| AMT8410T46L | -40 °C to +85 °C | TO-46L Ball Lens Package | - |

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