AMT8302

2.125 Gb/s Integrated 850nm MSM-TIA

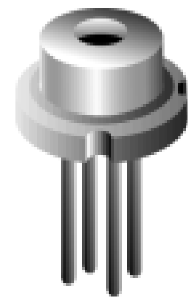
PRELIMINARY DATA SHEET - Rev 1.2

FEATURES

- Differential Output TIA
- 3.3 V Operation
- Automatic Gain Control
- Integrated 850nm MSM Detector & TIA
- TO-56 Ultra Flat-Window Hermetic Package
- High Reliability

APPLICATIONS

- 2x Fibre Channel (2.125 Gb/s)



T56F
TO-56 Ultra Flat Window Package

PRODUCT DESCRIPTION

The ANADIGICS AMT8302 is a 3.3 V 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 TO56 flat window packaged receiver pass stringent reliability requirements. These products are readily designed into receivers and transceivers for 2X Fibre Channel applications.

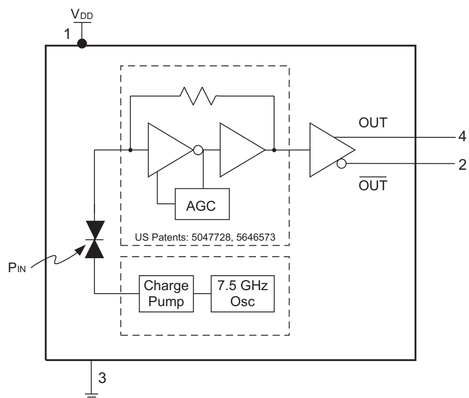


Figure 1: AMT8302 Equivalent Circuit

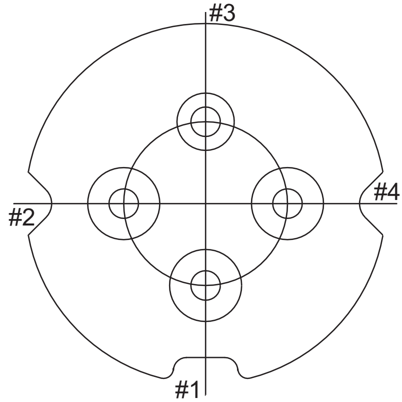


Figure 2: T56 Pinout (Bottom View)

Table 1: Pin Description

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

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT
Supply Voltage (V_{DD})	-	+6.0	V
Optical Input Power (P_{IN})	-	+5	dBm
Storage Temperature (T_{STG})	-65	+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)	770	850	860	nm
Detector Diameter	-	100	-	µm
Small Signal Differential Responsivity (1) (@ 50 MHz)	1000	-	-	V/W
Bandwidth(1)	1400	1900	-	MHz
Low Frequency Cutoff	-	-	300	kHz
Output Resistance	-	40	-	Ω
Optical Overload (2)	0	-	-	dBm
Optical Sensitivity (2)	-19	-	-	dBm
Differential Output Voltage (3)	-	750	-	mV
T_{RISE} and T_{FALL} (20-80%) (3)	-	140	-	ps
Duty Cycle Distortion (3)	-	5	-	%
Total Jitter (3), (4)	-	50	-	ps
Supply Current	-	35	55	mA
Operating Voltage Range	+ 3.0	+3.3	+3.6	V
Operating Case Temperature Range	0	-	80	°C

Notes:
(1) Measured at -14 dBm optical input power with output connected into R_L = 100 Ω (differential)
(2) Measured at 10^{-10} BER with a 2^7-1 PRBS at 2.125 Gb/s
(3) Measured with a 2^7-1 PRBS at 2.125 Gb/s, an input optical power of -3 dBm and R_L = 100 Ω (differential)
(4) 6σ about the center eye crossing

PERFORMANCE DATA

Figure 3: Eye Diagram with an Optical Input Power of -18 dBm

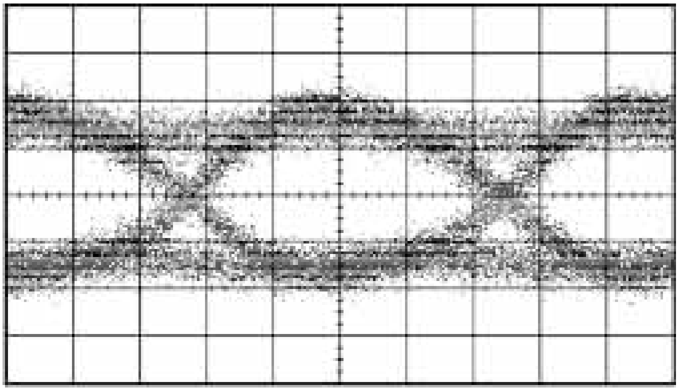


Figure 4: Eye Diagram with an Optical Input Power of -8.0 dBm

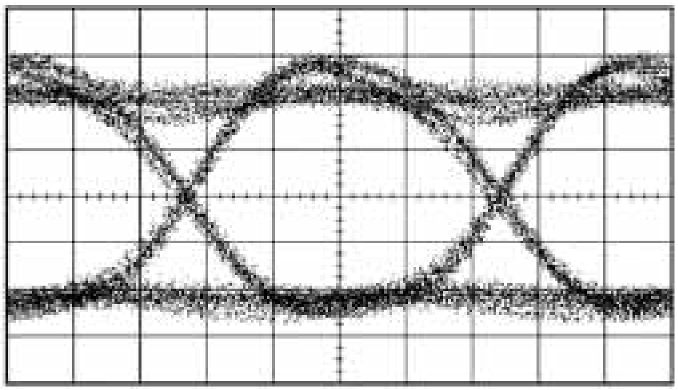


Figure 5: Eye Diagram with an Optical Input Power of 0 dBm

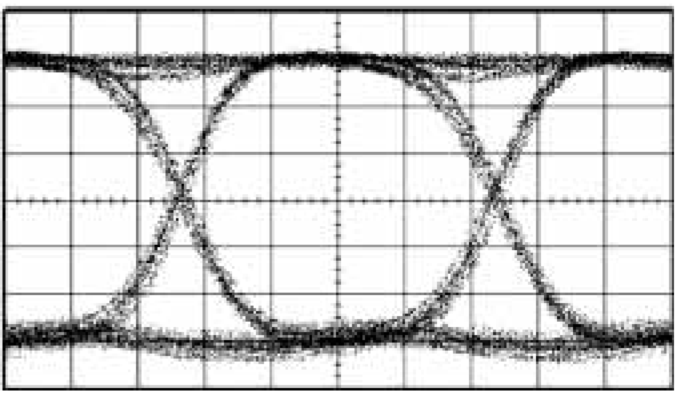


Figure 6: Supply Current vs.Temperature

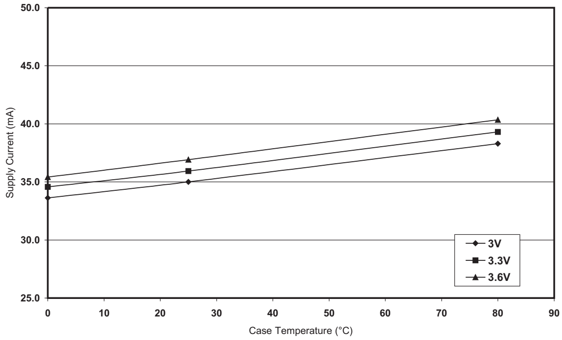


Figure 7: Bandwidth vs. Temperature

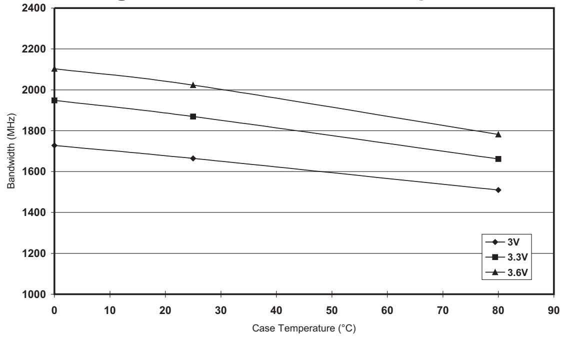


Figure 8: Differential Responsivity vs. Temperature

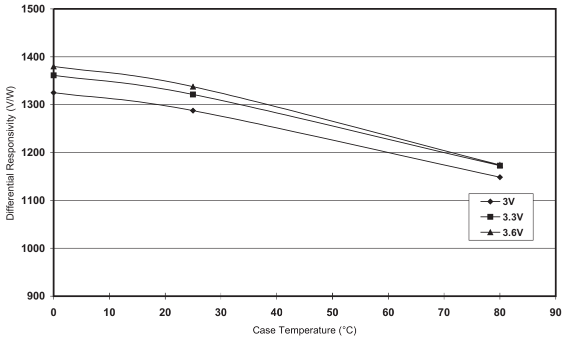
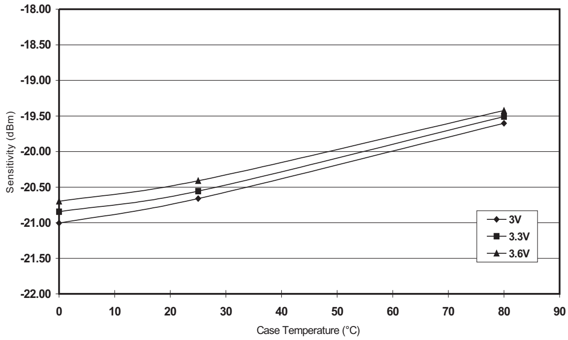


Figure 9: Sensitivity vs. Temperature



MEASUREMENT METHODS

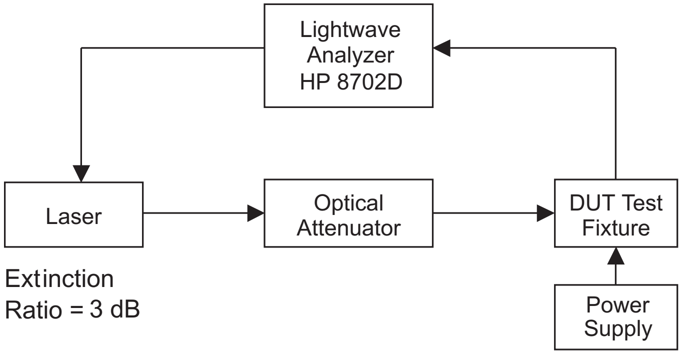


Figure 10: Test Setup for Frequency Response

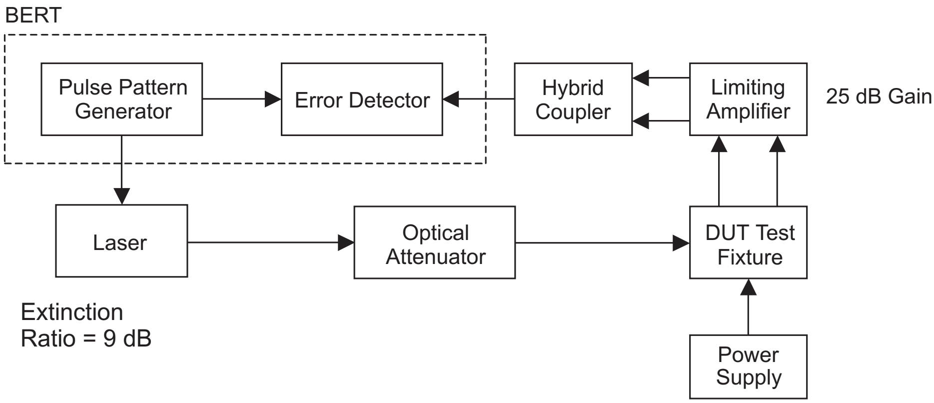


Figure 11: Test Setup for Sensitivity

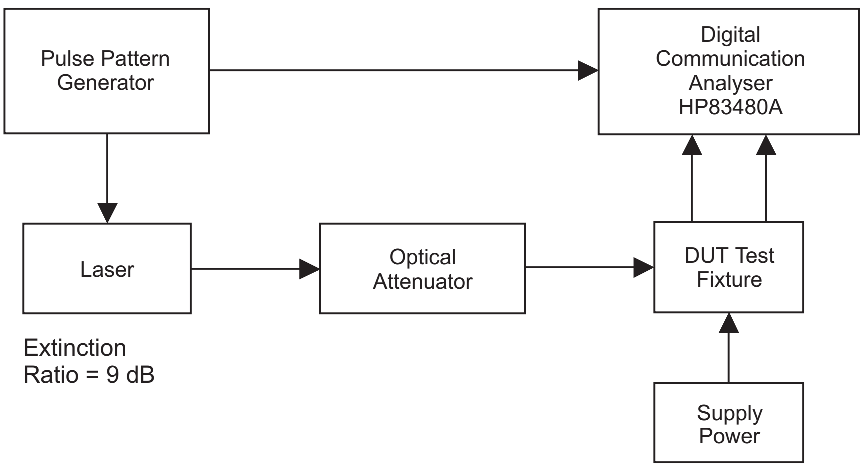


Figure 12: Test Setup for Eye Measurements

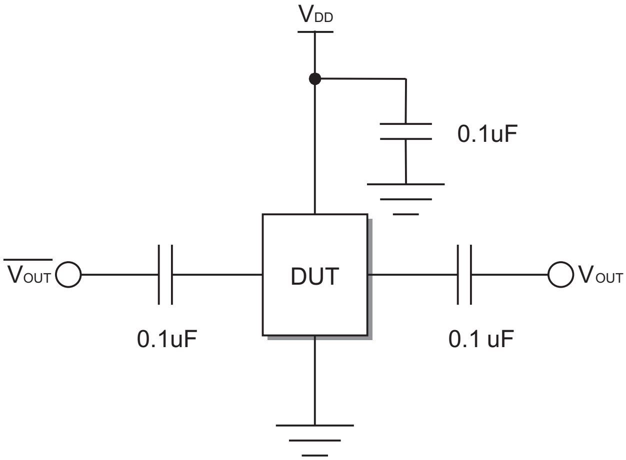


Figure 13: DUT Test Fixture Schematic

APPLICATION INFORMATION

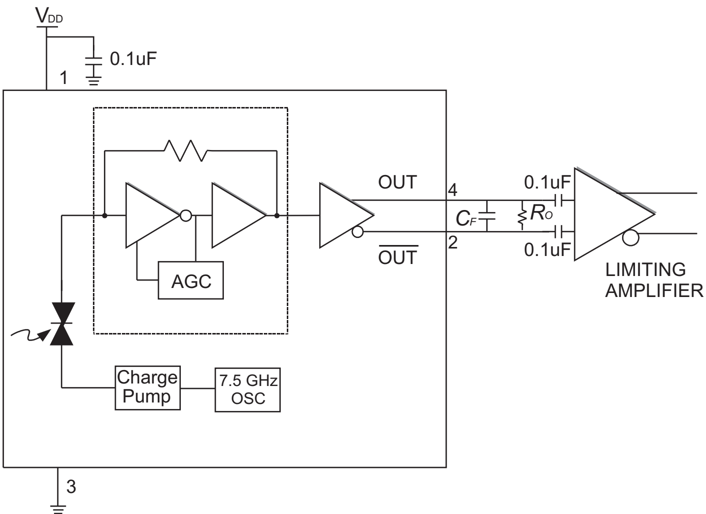


Figure 14: Application Schematic

C_F is an optional single pole noise filter

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

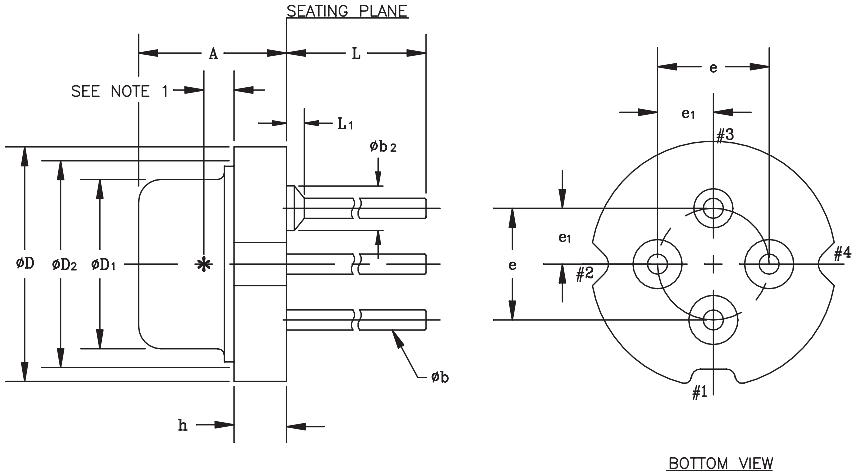
f_c is the desired cutoff frequency

$R = 50\ \Omega$

R_O is required with high input resistance limiting amplifiers

$R_O = 100\ \Omega$

COMPONENT PACKAGING



MM CONTROLLING DIMENSIONS

SYMBOL	MILLIMETERS		INCHES		NOTE
	MIN.	MAX.	MIN.	MAX.	
A	3.10	3.50	0.122	0.138	
øb	0.40	0.50	0.016	0.020	
øb2	–	1.20	–	0.047	
øD	5.56	5.62	0.219	0.221	5
øD1	3.80	3.90	0.150	0.154	
øD2	–	4.70	–	0.185	4&5
e	2.54 T.P.		0.100 T.P.		
e1	1.27 T.P.		0.050 T.P.		
h	1.10	1.30	0.043	0.051	
L	6.00	7.00	0.236	0.276	
L1	–	0.50	–	0.020	

NOTES:

1. INTERNAL OPTICAL HEIGHT = 0.70±0.04[0.028±0.0015]
2. DETECTOR DIODE PLACEMENT ACCURACY: ⌖ 0.15MM[0.006] WITH RESPECT TO CENTER OF HEADER.
3. CAN PLACEMENT ACCURACY: ⌖ 0.2MM[0.008] WITH RESPECT TO CENTER OF HEADER.
4. AREA DESIGNATED BY øD2 TO BE MEASURED WITH RESPECT TO CENTER OF HEADER.
5. AREA BETWEEN øD AND øD2 MUST REMAIN CLEAR, FLAT AND UNAFFECTED BY WELD OR WELD PROCESS.
6. BENT LEADS SHOULD NOT EXTEND OUTSIDE DIAMETER (øD) OF HEADER OR TOUCH EACH OTHER.

Figure 15: T56F Package Outline

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ORDERING INFORMATION

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AMT8302T56F	0 °C to +80 °C	TO-56 Ultra Flat Window Package	-

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