AMT8302

2.125 Gb/s Integrated 850nm MSM-TIA

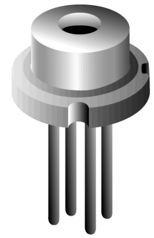
Preliminary Data Sheet - Rev 0

FEATURES

- Differential Output TIA
- 3.3V 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 3.3V 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 receiversand transceivers for 2X Fibre Channel applications.

Figure 1: AMT8302 Equivalent Circuit

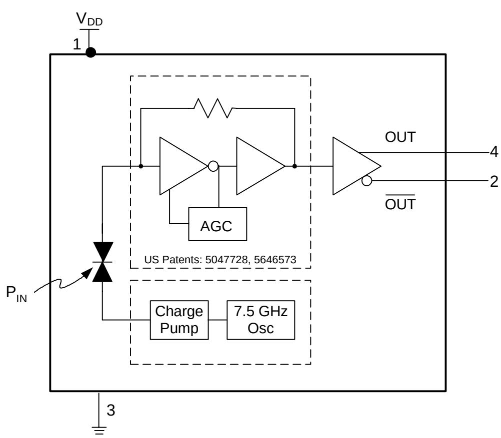


Table 1: Absolute Maximum Ratings

V_{DD}	6.0V
P_{IN}	+5dBm
T_S	Storage Temp. - 65 °C to 125 °C

Table 2: Electrical Characteristics

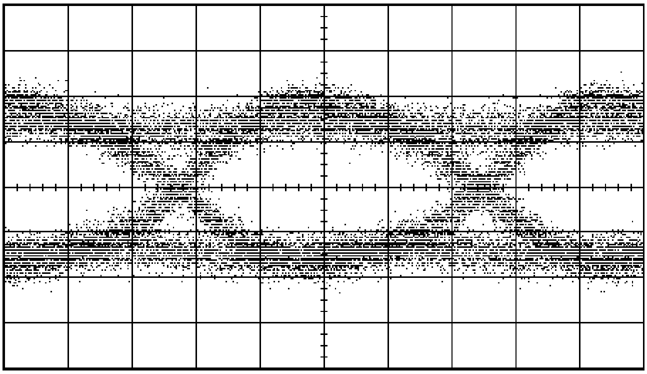
PARAMETER	MIN	TYP	MAX	UNIT
Wavelength (λ)	770	850	860	nm
Detector Diameter	-	100	-	µm
Small Signal Differential Responsivity (1) (@ 50 MHz)	1000	-	-	V/W
Bandwidth(1)	1400	1900	-	MHz
Low Frequency Cutoff	-	-	300	kHz
Output Resistance	-	40	-	Ω
Optical Overload (2)	0	-	-	dBm
Optical Sensitivity (2)	-19	-	-	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	Volts
Operating Case Temperature Range	0	-	80	°C

(1) Measured at –14 dBm optical input power with output connected into R_L = 100Ω (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 -3dBm and R_L = 100 Ω (differential)
(4) 6σ about the center eye crossing

Table 3: Package PIN Description

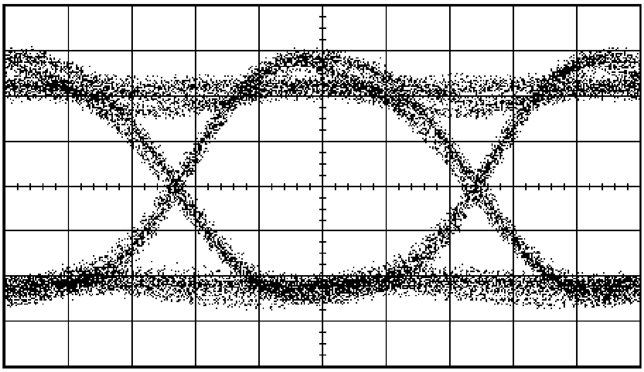
Pin	Description	Comment
1	V_{DD} - Positive Supply Voltage	+3.3 Volts
2	$\overline{V_{OUT}}$ - TIA Output Voltage (Inverted)	Logical '0' with optical input
3	Ground	Case is grounded
4	V_{OUT} - TIA Output Voltage (Non-Inverted)	Logical '1' with optical input

Figure 2: Eye Diagram with an Optical Input Power of -18dBm



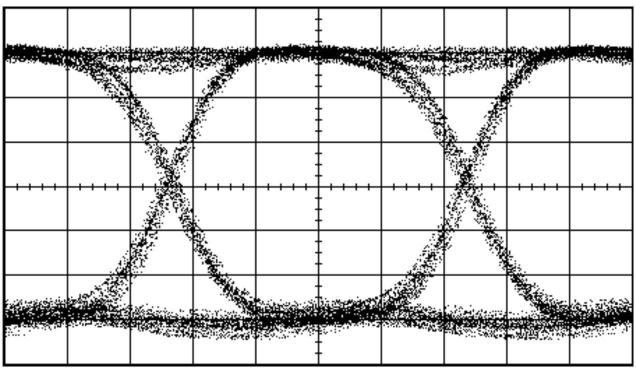
10mV/Div 100ps/Div

Figure 3: Eye Diagram with an Optical Input Power of -8.0dBm



60mV/Div. 100ps/Div

Figure 4: Eye Diagram with an Optical Input Power of 0dBm



150mV/Div. 100ps/Div

Figure 5: Supply Current vs. Temperature

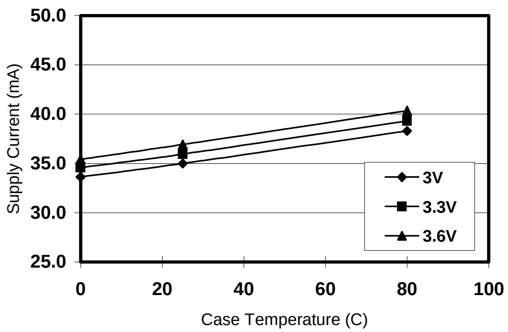


Figure 6: Bandwidth vs. Temperature

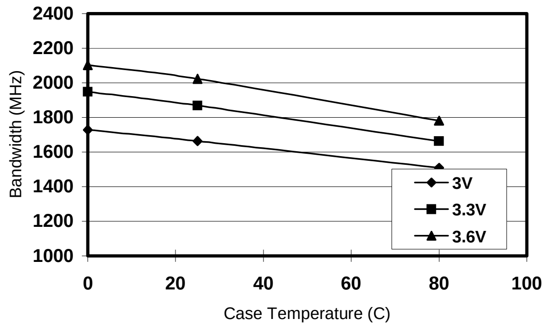


Figure 7: Differential Responsivity vs. Temperature

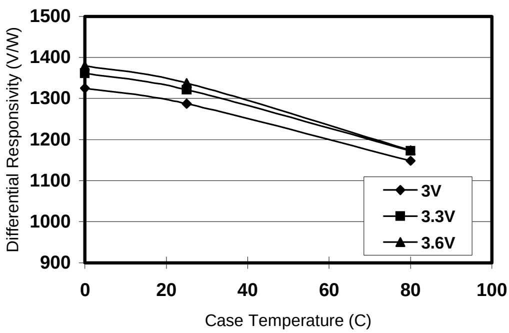


Figure 8: Sensitivity vs. Temperature

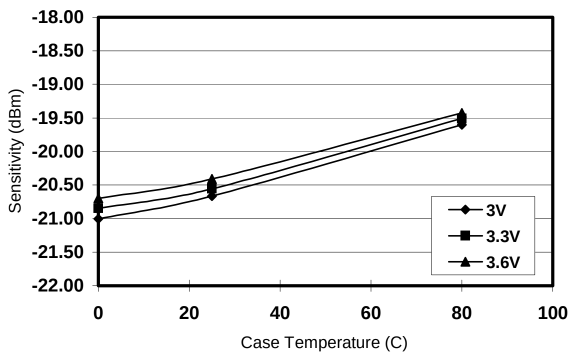


Figure 9: Test Setup for Frequency Response

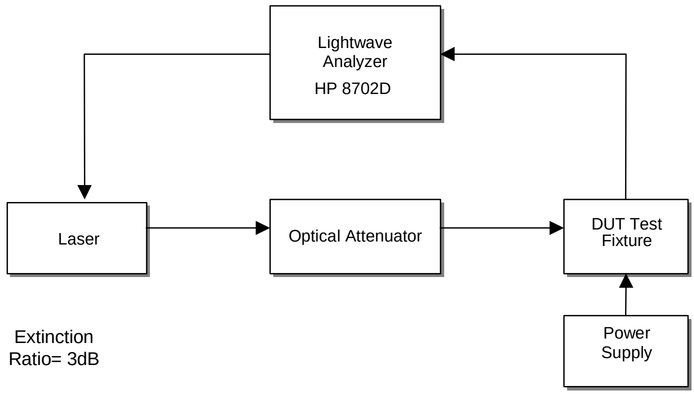


Figure 10: Test Setup for Sensitivity

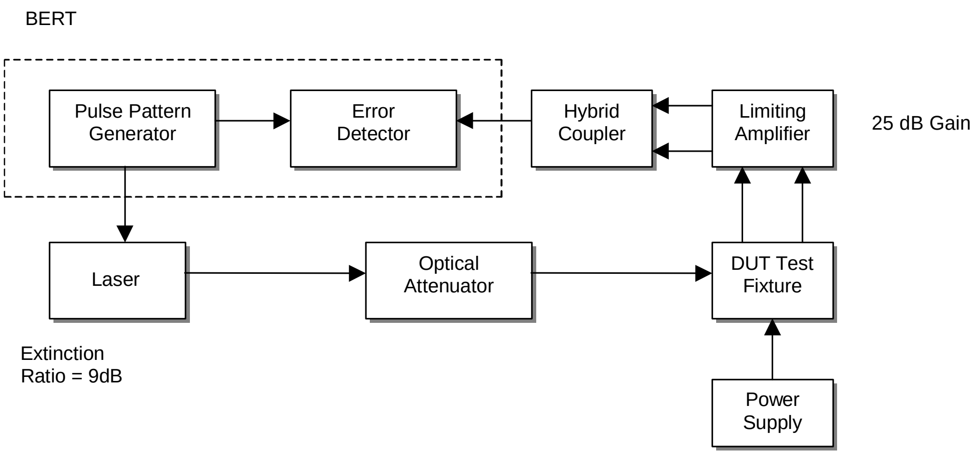


Figure 11: Test Setup for Eye Measurements

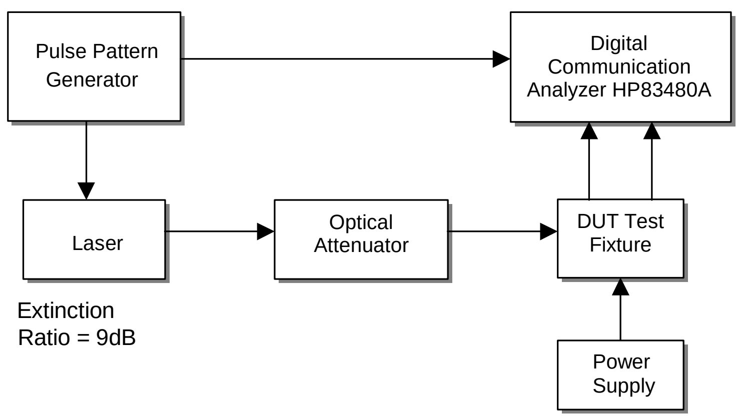


Figure 12: DUT Test Fixture Schematic

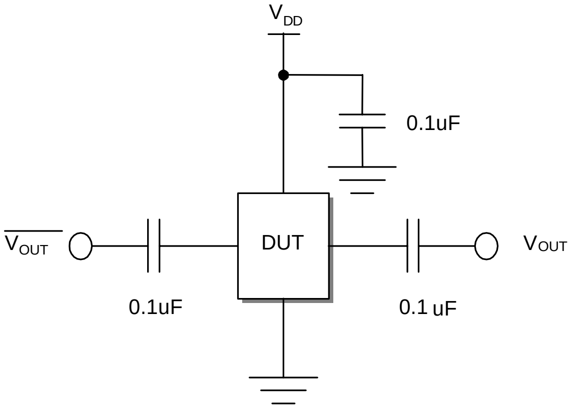
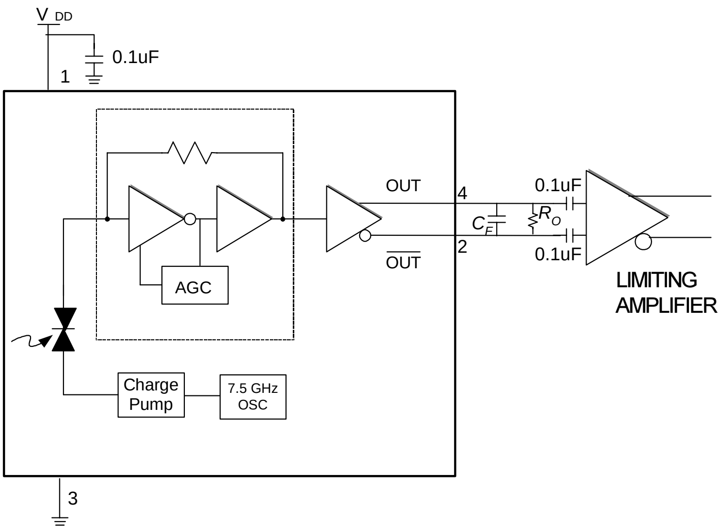


Figure 13: Application Schematic



C_F is an optional single pole noise filter

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

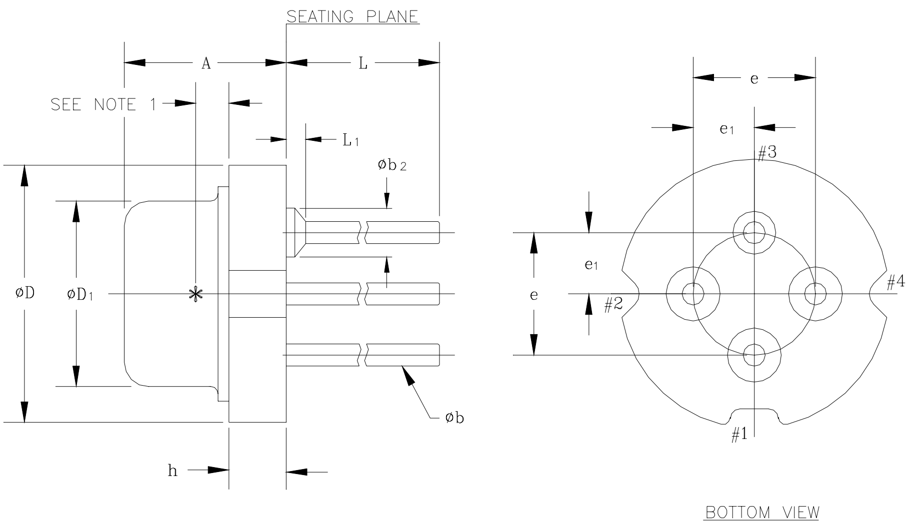
f_c is the desired cutoff frequency

R = 50 Ω

R_O is required with high input resistance limiting amplifiers

R_O = 100 Ω

Figure14: T56F Package Outline Design



MM CONTROLLING DIMENSIONS

SYMBOL	MILLIMETERS		INCHES		NOTE
	MIN.	MAX.	MIN.	MAX.	
A	3.10	3.50	0.122	0.138	
øb	0.41	0.48	0.016	0.019	
øb2	–	0.89	–	0.035	
øD	5.57	5.60	0.219	0.221	
øD1	3.80	3.90	0.150	0.154	
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	–	0.38	–	0.015	

NOTES:

1. INTERNAL OPTICAL HEIGHT = 0.70±0.04[0.028±0.0015]
2. BENT LEADS SHOULD NOT EXTEND OUTSIDE DIAMETER (øD) OF CAP OR TOUCH EACH OTHER.
3. ALL DIMENSIONS ARE REFERENCE ONLY, EXCEPT A, øD & h.
4. DETECTOR DIODE PLACEMENT ACCURACY: ⌖ 0.15MM[0.006] WITH RESPECT TO CENTER OF HEADER: REFERENCE ONLY.
5. CAN PLACEMENT ACCURACY: ⌖ 0.2MM[0.008] WITH RESPECT TO CENTER OF HEADER: REFERENCE ONLY.

Ordering Information

Part Number	Package Option	Package Description
AMT8302T56F	TO-56F	Ultra Flat Window Package

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