



# ATA121302D1C

## 1.25 Gb/s Transimpedance Amplifier

### Advanced Product Information

Rev 0

#### FEATURES

- 1.25 Gb/s Differential Output TIA
- Automatic Gain Control

#### APPLICATIONS

- Gigabit Ethernet (1.250 Gb/s)
- Fibre Channel (1.064 Gb/s)

#### ELECTRICAL CHARACTERISTICS<sup>(1)</sup> ( $T_A = 25\text{ }^\circ\text{C}$ , $V_{DD} = +5.0\text{V} \pm 10\%$ )

PARAMETER	MIN	TYP	MAX	UNIT
Small Signal Differential ( $R_L = 100\ \Omega$ ) Transresistance <sup>(2)</sup>	-	2.8	-	$K\Omega$
Bandwidth	1000	1100	-	MHz
Low Frequency Cutoff	-	800	-	kHz
Input Resistance		100		$\Omega$
Output Resistance	-	40	-	$\Omega$
Input Offset Voltage	-	1.4	-	V
Output Offset Voltage	-	2.2	-	V
Photodiode Biasing Voltage ( $V_N$ )		-5	-	V
Optical Overload <sup>(1), (3)</sup>	-3		-	dBm
Optical Sensitivity <sup>(1), (3)</sup>	-	-25		dBm
Differential Output Voltage <sup>(4), (5)</sup>	-	350	-	mV
$T_{RISE}$ & $T_{FALL}$ (20 - 80%) <sup>(5), (6)</sup>	-	280	-	ps
Duty Cycle Distortion <sup>(4), (7)</sup>	-	4	-	%
RMS Jitter <sup>(4), (7), (8)</sup>	-	20	-	ps
Total Jitter (pk-pk) <sup>(4), (7), (9)</sup>	-	100	-	ps
Supply Current	-	35	-	mA
Operating Voltage Range	+4.5	+5.0	+5.5	V
Operating Temperature Range	0	-	85	$^\circ\text{C}$
Input Noise Current	-	TBD	-	nA

1. Measured with a photodiode having a maximum capacitance of 0.6 pF and a minimum responsivity of 0.8 AW.
2.  $f = 50\text{ MHz}$
3. Measured at  $10^{-10}$  BER with a  $2^7-1$  PRBS, 1.25 Gb/s.
4. Input optical power = -3 dBm,  $R_L = 100\ \Omega$  (differential)
5. Measured with a 625 MHz, 50% duty cycle square wave.
6. Measured differentially at -14dBm optical input power.
7. Measured with a  $2^7-1$  PRBS.
8.  $1\sigma$  about the center eye crossing.
9.  $6\sigma$  about the center eye crossing.

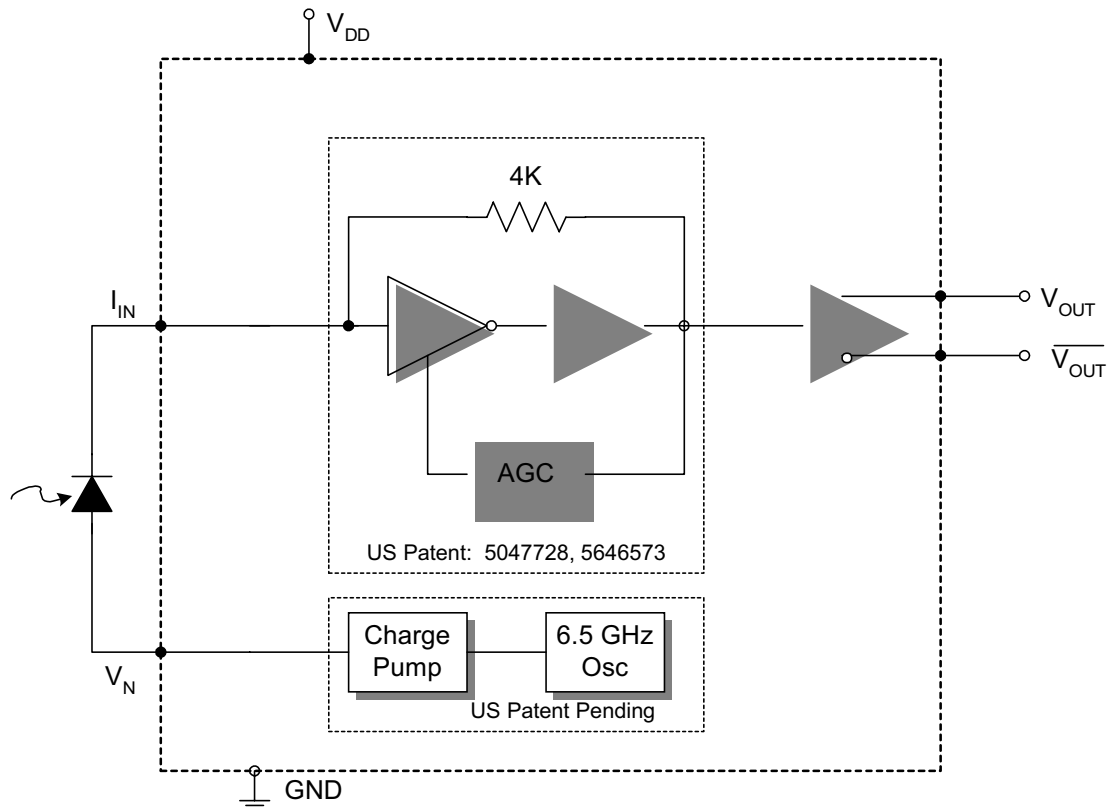
### ABSOLUTE MAXIMUM RATINGS

$V_{DD}$	7.0 V
$I_{IN}$	3.5 mA
$T_S$	Storage Temp. - 65 °C to 125 °C

### ATA121302D1C PAD DESCRIPTION

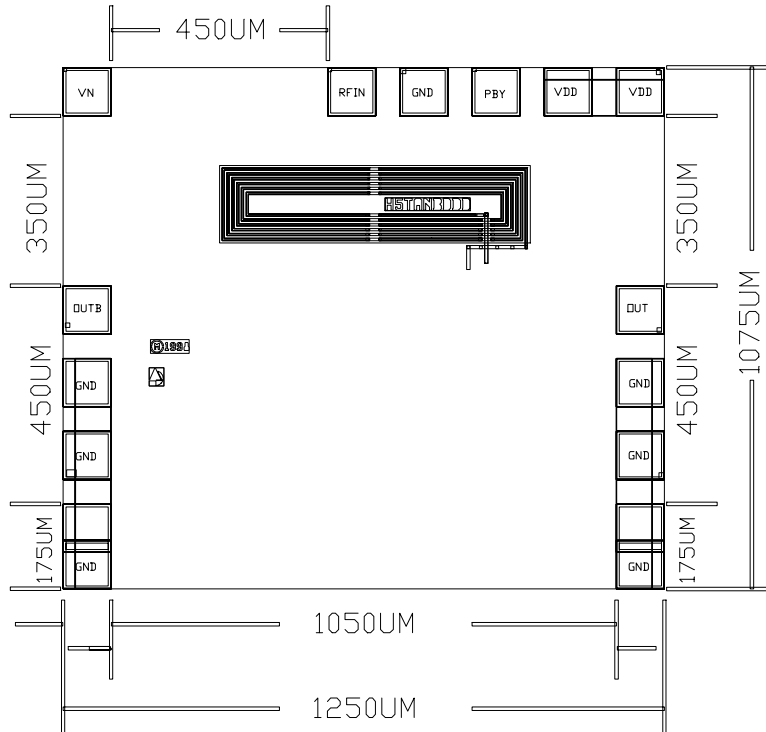
PAD	Description	Comment
$V_{DD}$	Positive Supply Voltage	+ 5 Volts
$I_{IN}$	TIA Input	Connect to detector cathode for proper operation
$V_N$	Negative Voltage for Photodiode Biasing	Connect to detector anode for optimum performance
$V_{OUT}$	TIA Output Voltage (Non-Inverted)	Logical '1' with optical input
$\overline{V_{OUT}}$	TIA Output Voltage (Inverted)	Logical '0' with optical input

### ATA121302D1C BLOCK DIAGRAM

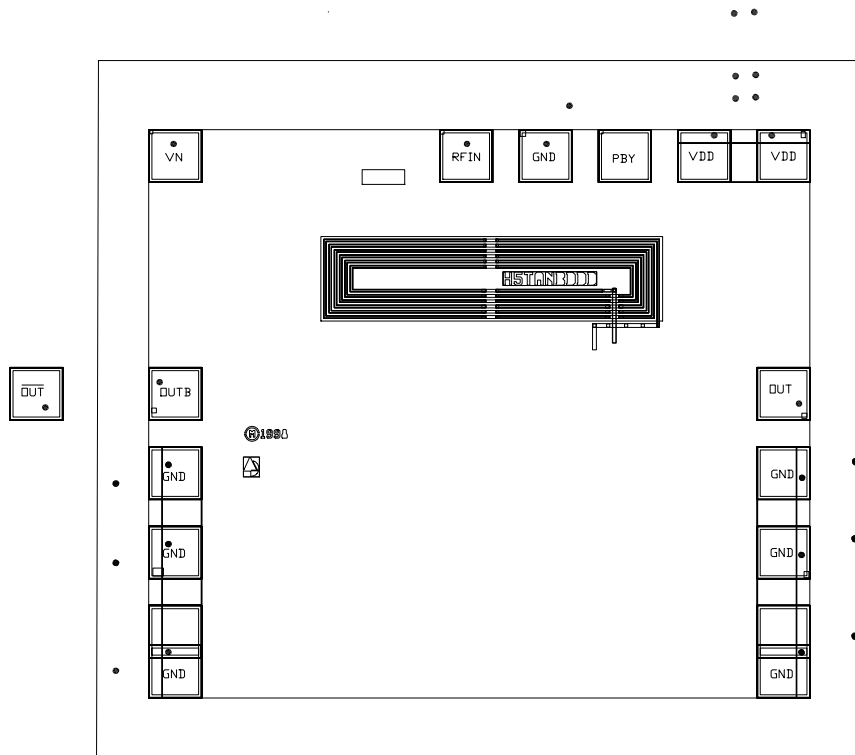


The photodetector cathode must be connected to  $I_{IN}$  and the anode can be connected to  $V_N$  or ground for proper AGC operation.

### BONDING PADS



### TYPICAL BONDING DIAGRAM



Scribe streets are 37.5 $\mu$ m wide

Typical Characteristics (measured with a photodiode)

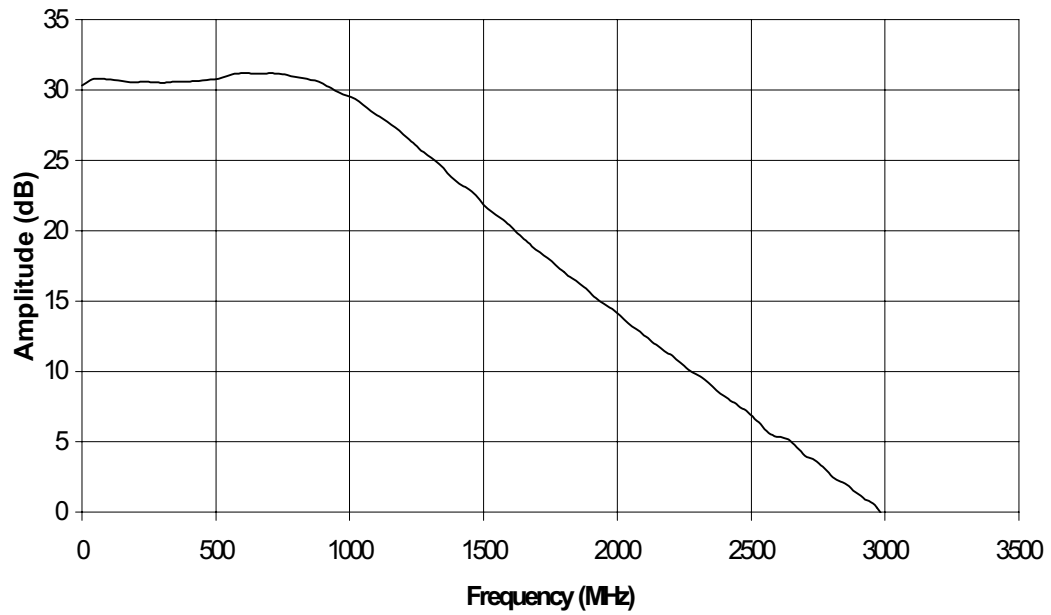


Figure 1. Frequency Response

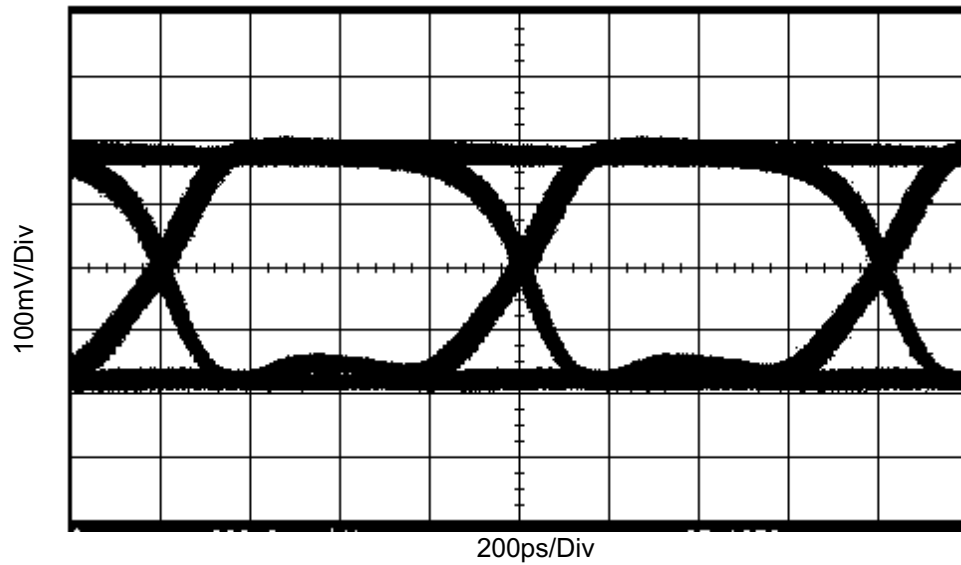


Figure 2. Eye Diagram with an Optical Input Power of -3dB

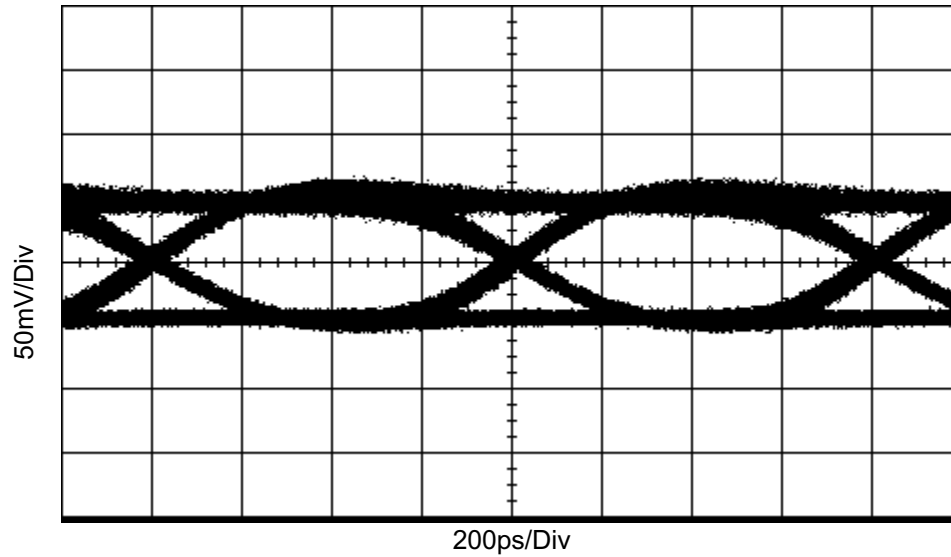


Figure 3. Eye Diagram with an Optical Input Power of  $-17$  dBm

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