

10 Gbps Transimpedance Amplifier TA205C

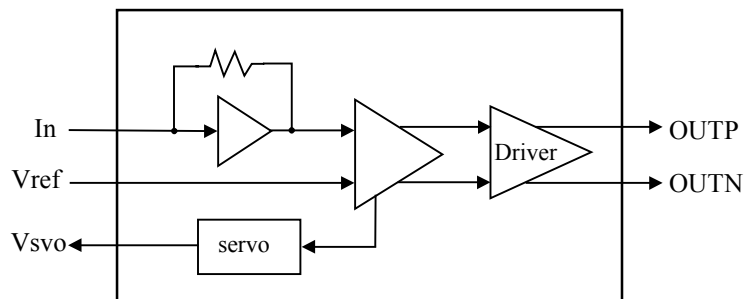
PRODUCT DESCRIPTION

TA205C is a high gain transimpedance amplifier optimized for 10Gb/s fiber optic communication systems such as 10 Gigabit Ethernet, SONET OC-192 and SDH STM-64. Compared to TA205B, TA205C operates across a wider temperature range. The transimpedance amplifier consists mainly of a transimpedance stage, a differential gain stage, and a differential 50 Ω output driver. An internal DC-control circuit is included to maintain proper data crossover points. Due to high gain of the amplifier, a differential output of 100mVp-p or larger is available with input current larger than 10uAp-p, eliminating the need of a separate post-amplifier in most applications. The amplifier is available in die form and can be integrated with PIN or APD photodetector to function as an optical receiver in 10 Gbps systems.

KEY FEATURES

- 10 k Ω (80 dB Ω) differential transimpedance gain
- 9 GHz Bandwidth
- Typical noise current density: 10 pA/rt Hz
- Internal circuitry for maintaining data crossover points
- <30 kHz low cutoff frequency
- Input bias: +2.6 V
- Current consumption: 48 mA
- Power supply: +5.0 V
- Die size: 1.4 mm x 1.1 mm

BLOCK DIAGRAM



ELECTRICAL SPECIFICATIONSPhotodiode and bond wire reference model $C_{pd}=0.2$ pF and $L_{pd}=0.7$ nH

| Parameter | Symbol | Min | Typical | Max | Unit |
|--|-------------|-------|---------|--------|------------------|
| Ambient Temperature | T_o | -40 | 25 | 85 | °C |
| Differential Transimpedance | Z_t | 7,000 | 10,000 | 12,000 | Ω |
| Input Noise Current Density ¹ | I_{noise} | | 10 | | pA/rtHz |
| Upper -3dB Bandwidth | BW | 8 | 9 | 10 | GHz |
| Low Frequency -3dB Cutoff ⁴ | BW_{LF} | 10 | 30 | 100 | kHz |
| Maximum Output Swing ² | V_{out} | 250 | 300 | 350 | mV _{pp} |
| Group Delay Variation ¹ | ΔGD | | 30 | | ps |
| Input Overload Current ³ | I_{OL} | | 2 | | mA |
| Output Impedance | Z_{OUT} | 45 | 50 | 55 | Ω |
| Minimum Output Return Loss ¹ | RL | | 10 | | dB |
| Current Consumption | I_{PS} | 42 | 48 | 55 | mA |

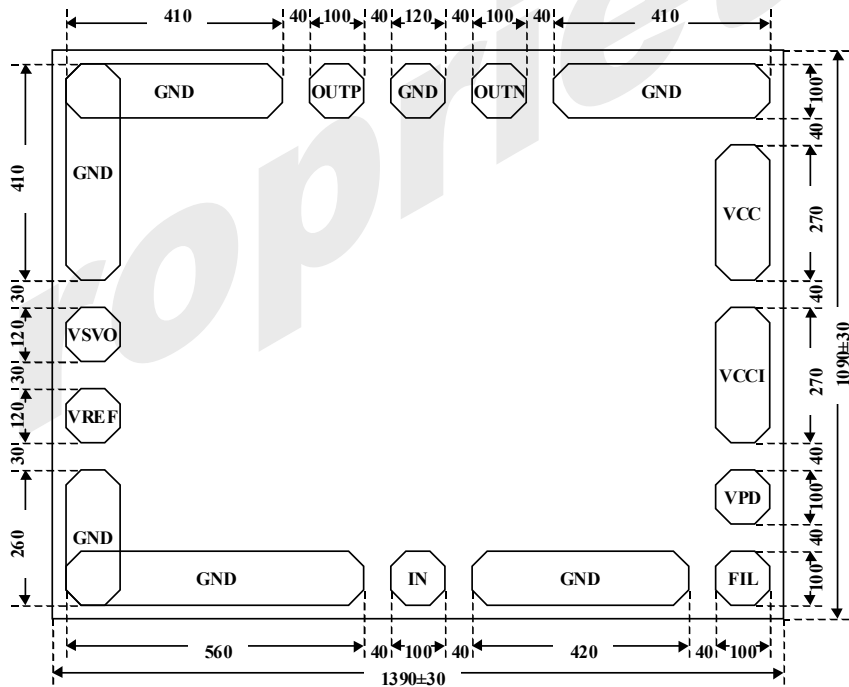
¹ 50 MHz to 10 GHz² single-ended³ for BER= 1×10^{-12} ; $2^{31}-1$ PRBS @ 10Gb/s⁴ 560pF external capacitor to pads Vsvo & Vref

PAD DESCRIPTION

| Name | Function | I/O | Signal |
|-------------|--|------------|--------|
| VCCI | Power supply (input), +5.0 V | PS | DC |
| VCC | Power supply, +5.0 V | PS | DC |
| GND | Ground | GND | DC |
| IN | RF input, connected to anode of photodiode | I | RF |
| OUTP | Non-inverted Output | O | RF |
| OUTN | Inverted Output | O | RF |
| VSVO | Reference voltage output | O | DC |
| VREF | Reference voltage input | I | DC |
| VPD | Photodiode bias voltage | PS | DC |
| FIL | Filter resistor output, connected to cathode of photodiode | O | DC |

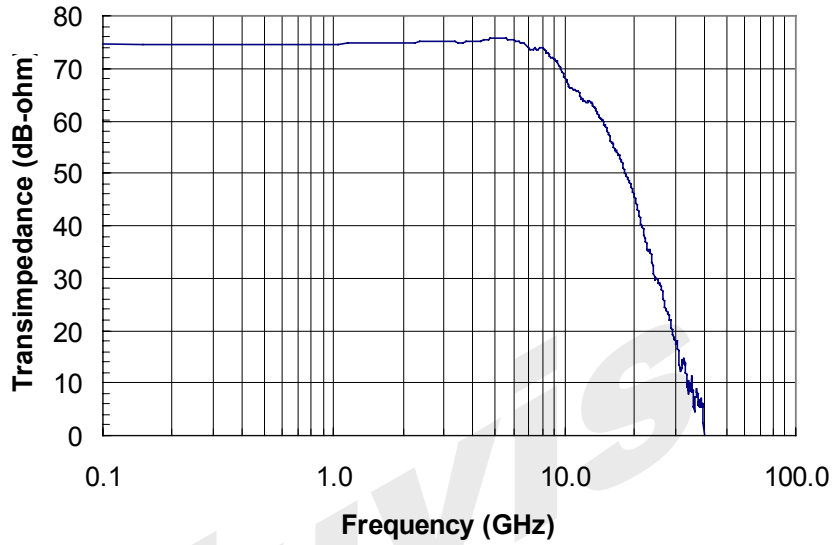
BOND PAD ARRANGEMENTS

- Die Size: 1390±30 μm x 1090±30 μm
- Die thickness: 7mil

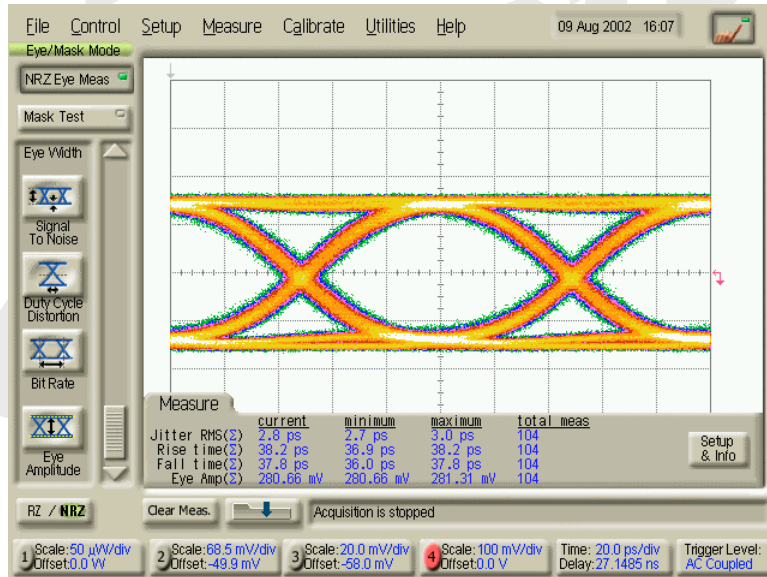


Unit: μm

TYPICAL PERFORMANCE



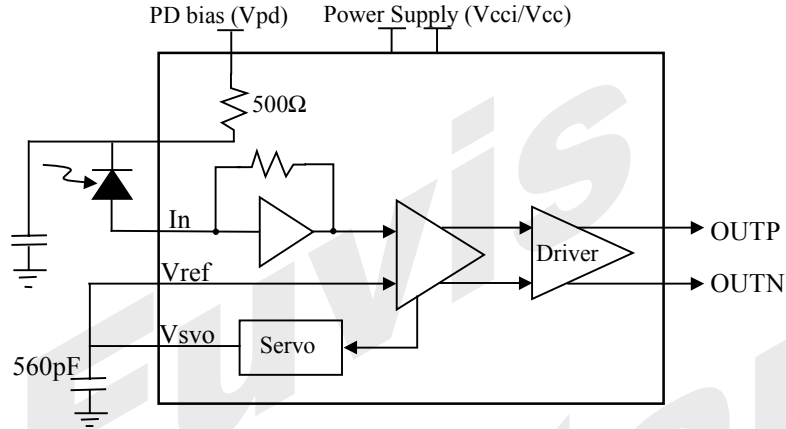
Typical transimpedance gain with reference PD and bond wire



Typical 10Gb/s single-ended output of PIN-TA205C (Pin=-14dBm)

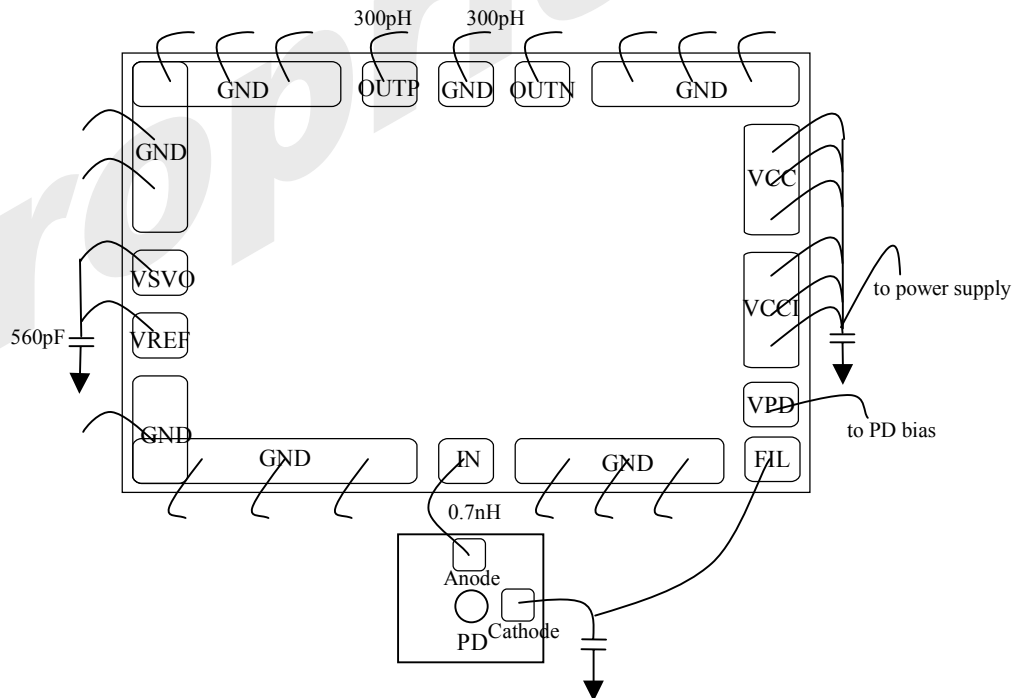
APPLICATION

To set the reference voltage (Vref) automatically and ensure proper low cutoff frequency, an external capacitor of 560pF or larger is recommended. A reference voltage is established through the servo circuitry in a feedback loop to maintain proper output DC offset voltage and data crossover points. Due to high internal gain of the amplifier, robust ground/power supplies, bond wire control, and electrical isolation between input and output ports of the die are all of paramount importance to prevent signal degradation or even oscillation. Please consult Euvis technical support for related issues.



BONDING REFERENCE

Bond wire inductance of 700pH is recommended for photodiode to TIA input connection; 300pH or less each of inductance is recommended for other bond wires.



Ordering Information:

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