Power Measurement & Control Solutions for Optical Networking

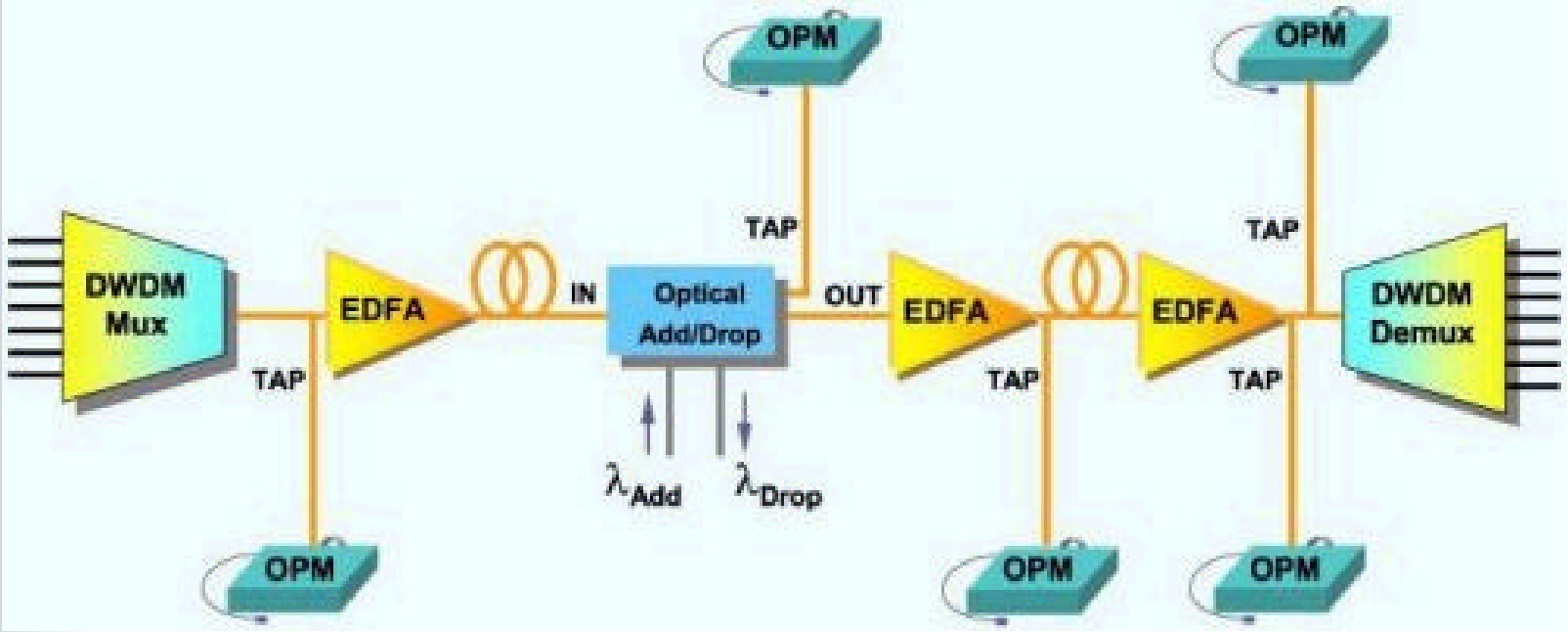
ANALOG
DEVICES

Detection Products

	AD8307	AD8310	AD8313	AD8314	AD8361
Frequency	500 MHz	500 MHz	2500 MHz	2500 MHz	3000 MHz
Dynamic Range	92 dB	92 dB	70 dB	45 dB	30 dB
Accuracy	+/-1 dB	+/-1 dB	+/-1 dB	+/-1 dB	+/-0.4 dB
Power Supply	3, 5V	3, 5V	3, 5V	2.7-5.5V	3, 5V
Package	SO-8	uSO8	uSO8	µSO-8	µSO-8 SOT23-6
Architecture	Log Amp	Log Amp	Log Amp	Log Amp	TruPwr™

ANALOG DEVICES

Optical Measurement Needs Across the Network



Optical Power Monitoring

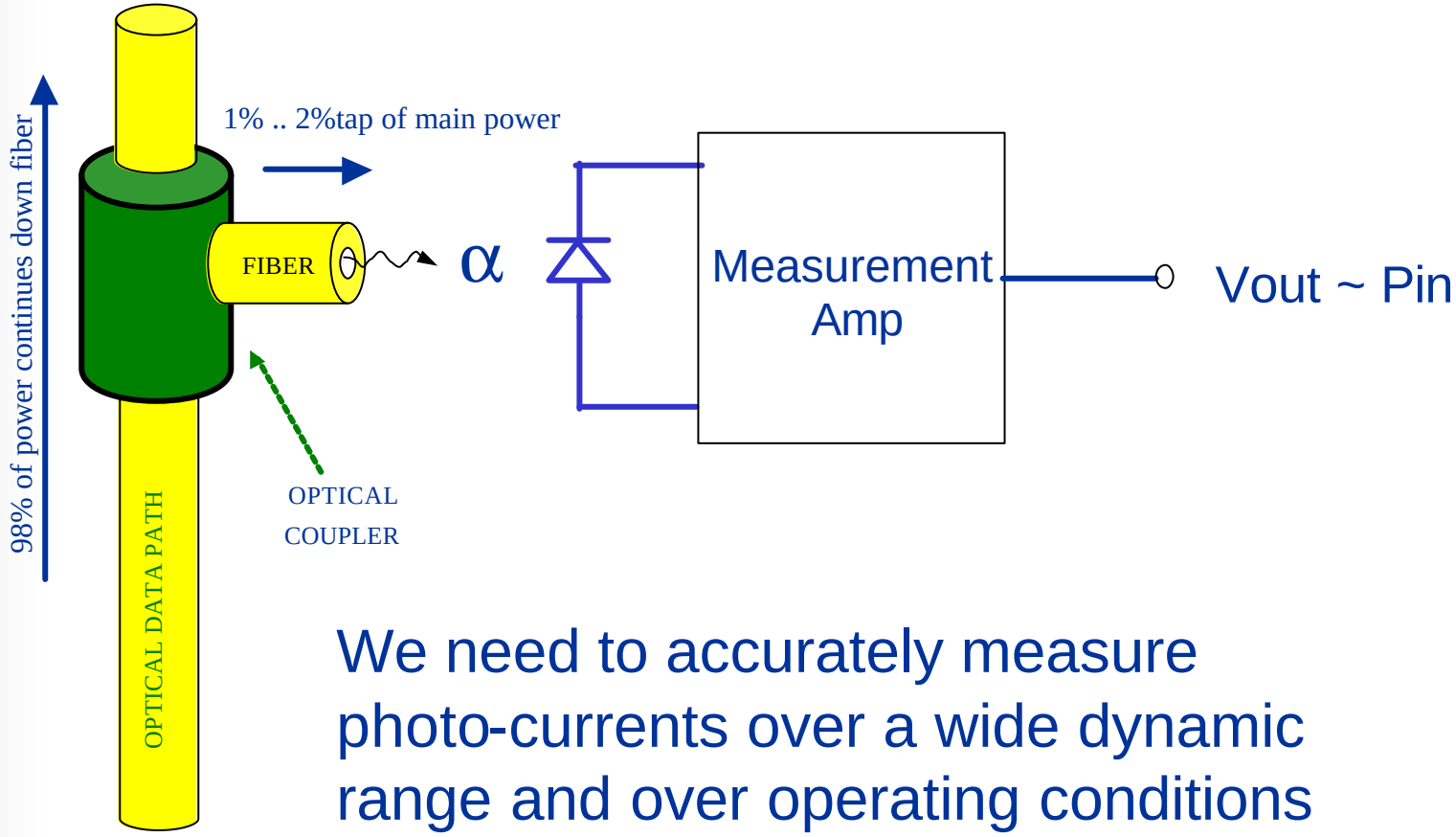
- Optical Amplifiers
- Optical Add Drop Multiplexers
- Transmit Lasers
- Pump Lasers
- OTDR Equipment
- Extinction Ratio Measurements

Optical Performance Monitoring

- Spectral Power Measurements
- EDFA Gain Profile Equalization
- Lambda Lockers
- Wavelength Management

ANALOG DEVICES

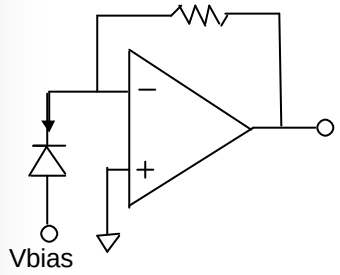
The Challenge

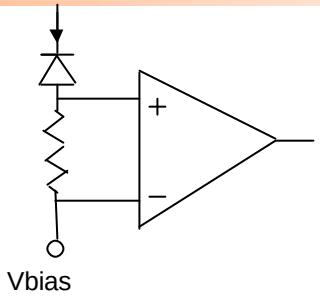


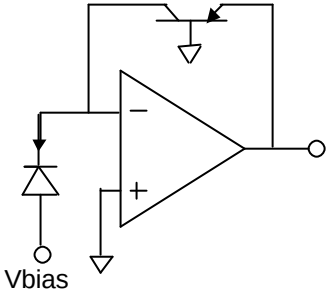
We need to accurately measure photo-currents over a wide dynamic range and over operating conditions

ANALOG DEVICES

Traditional Methods



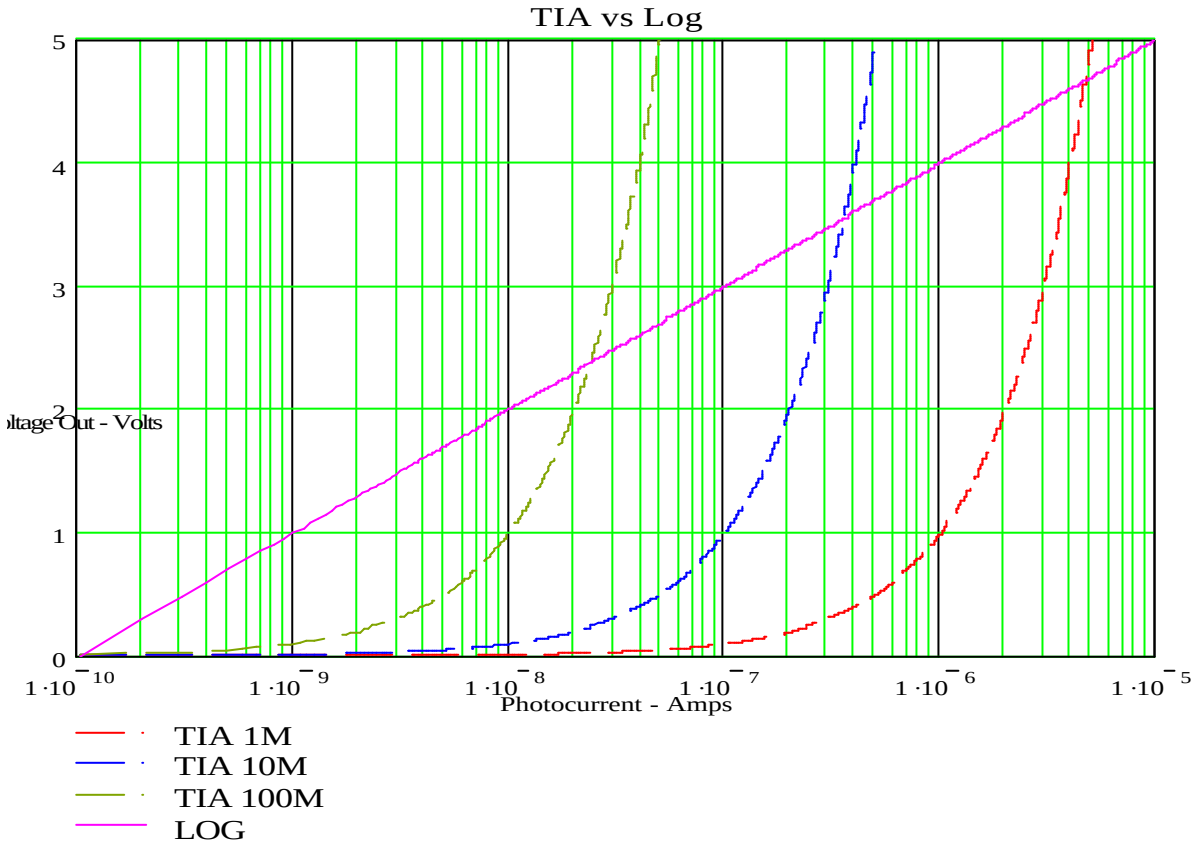




	TIA	In - Amp	Log Amp
pros	• Simple • High Speed	• Simple • Good Precision	• Wide Range • Good Precision • Easy to Calibrate
cons	• Poor Range • No Temp Comp • Requires Cal	• Limited Range • Requires Cal	• Higher ASP • Lack of ICs
ADI Part	AD8015, AD825, AD706, AD8551, AD549, etc…	AD620, AD622, AD629, AMP02	AD8304

ANALOG DEVICES

Benefits of Logarithmic Conversion

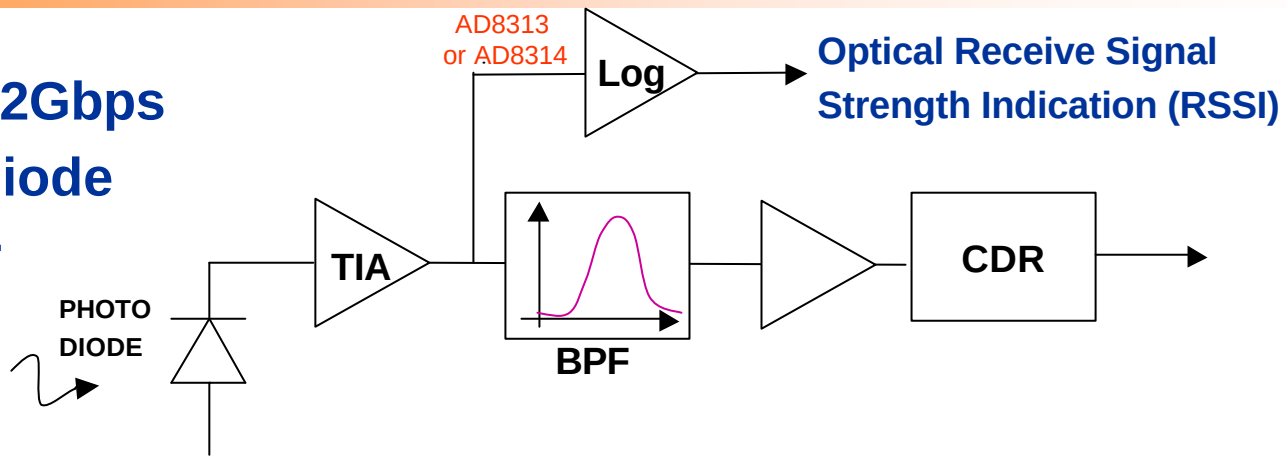


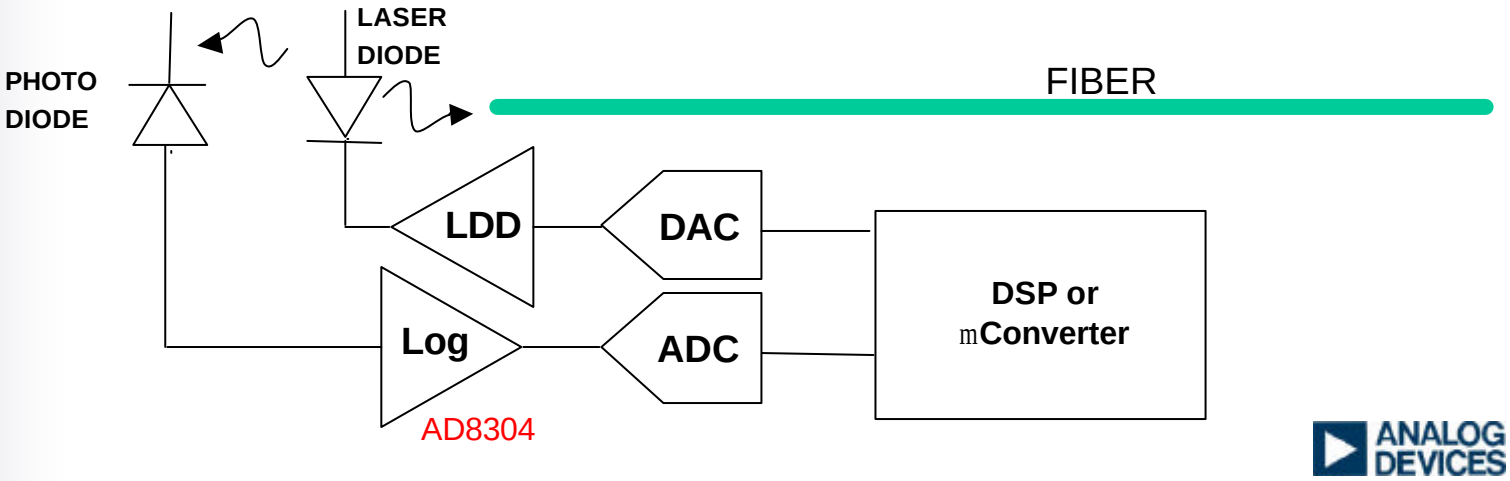
Log Amp covers wide dynamic range, classical transimpedance amplifiers (TIAs) require a specific transresistance to cover a desired range.

ANALOG DEVICES

Detectors in Optical Networks

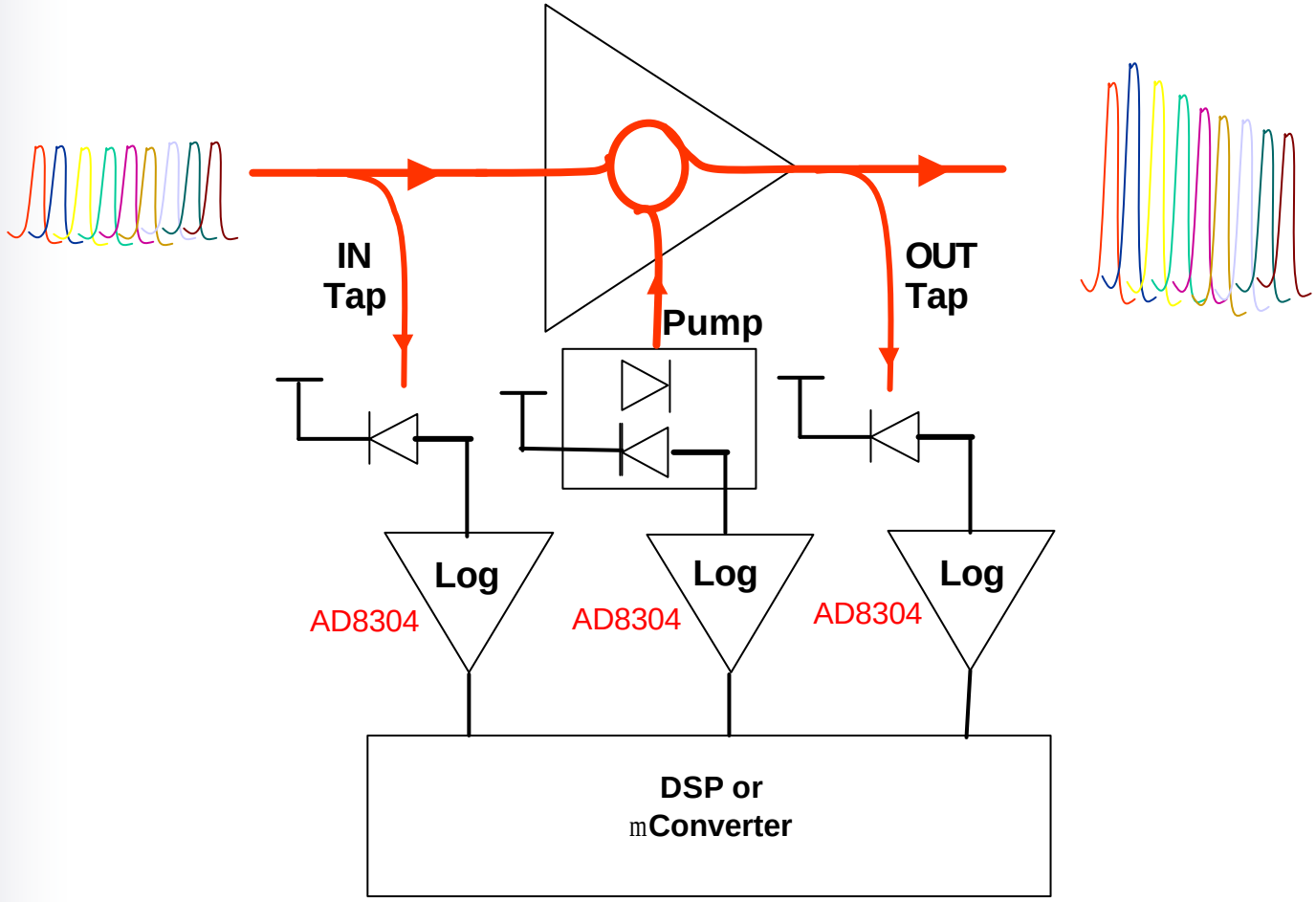
0.52 - 3.2Gbps photo diode monitor





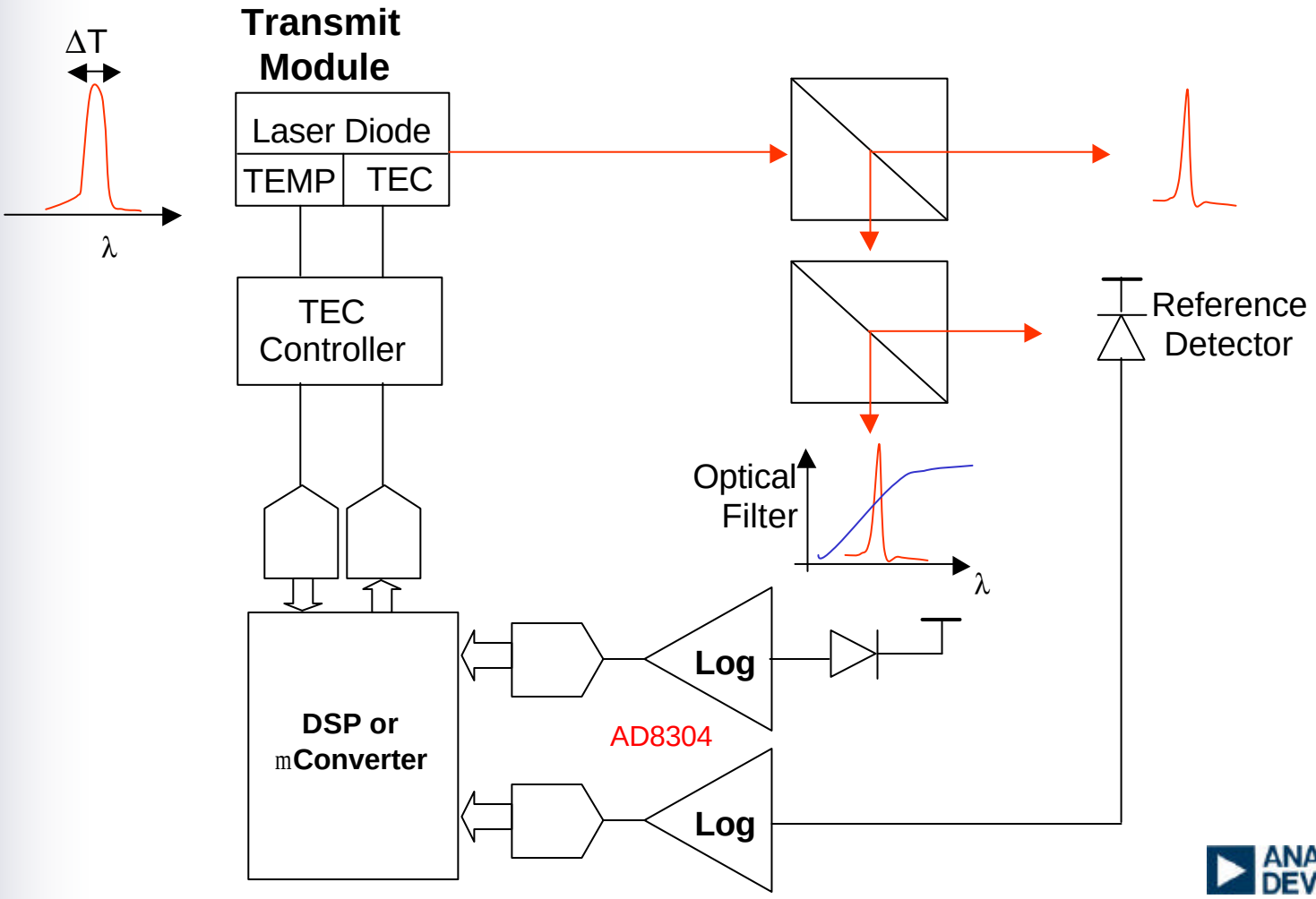
ANALOG DEVICES

Detectors in Optical Networks - EDFA

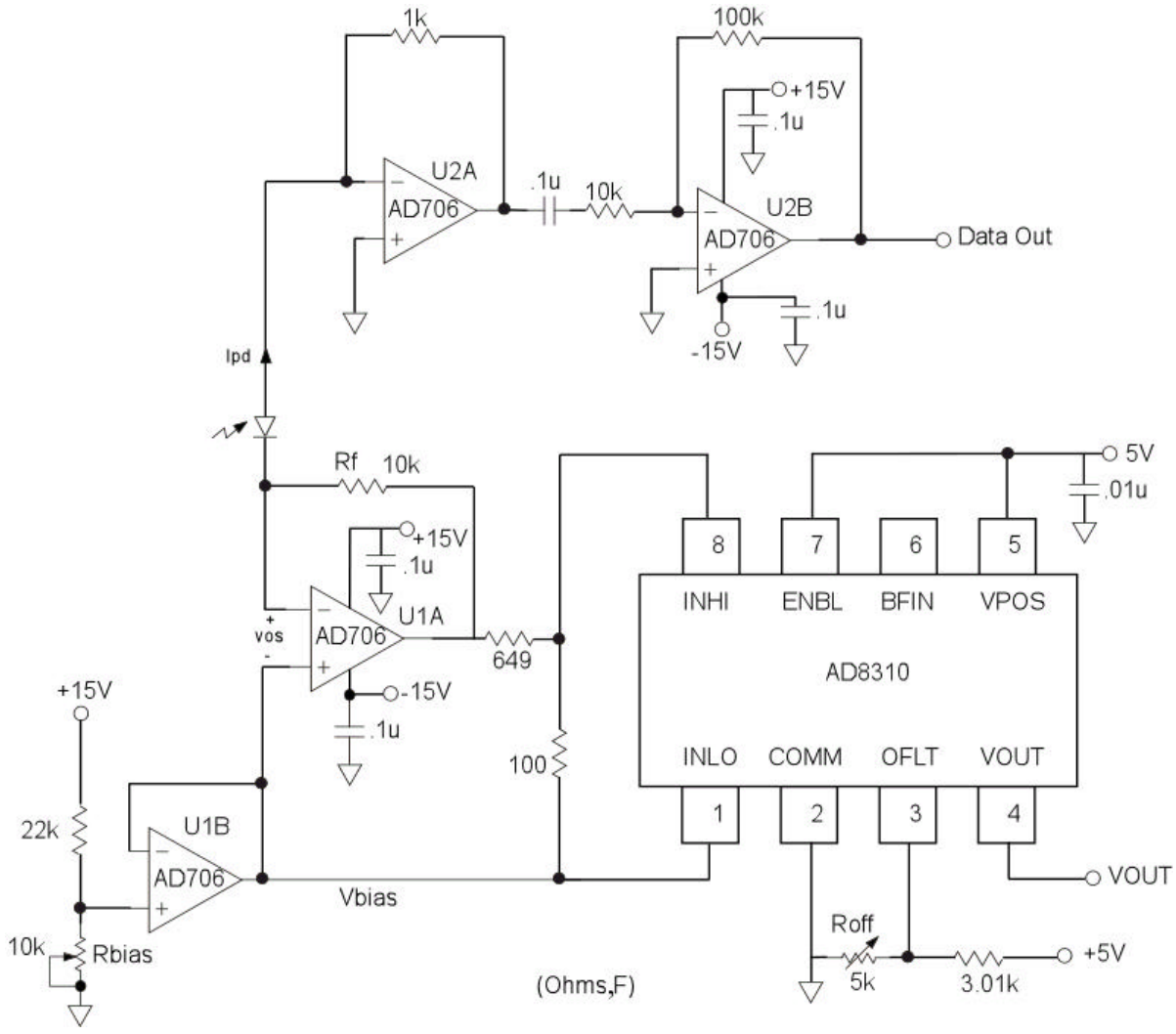


ANALOG DEVICES

Detectors in Optical Networks - Transmit Modules

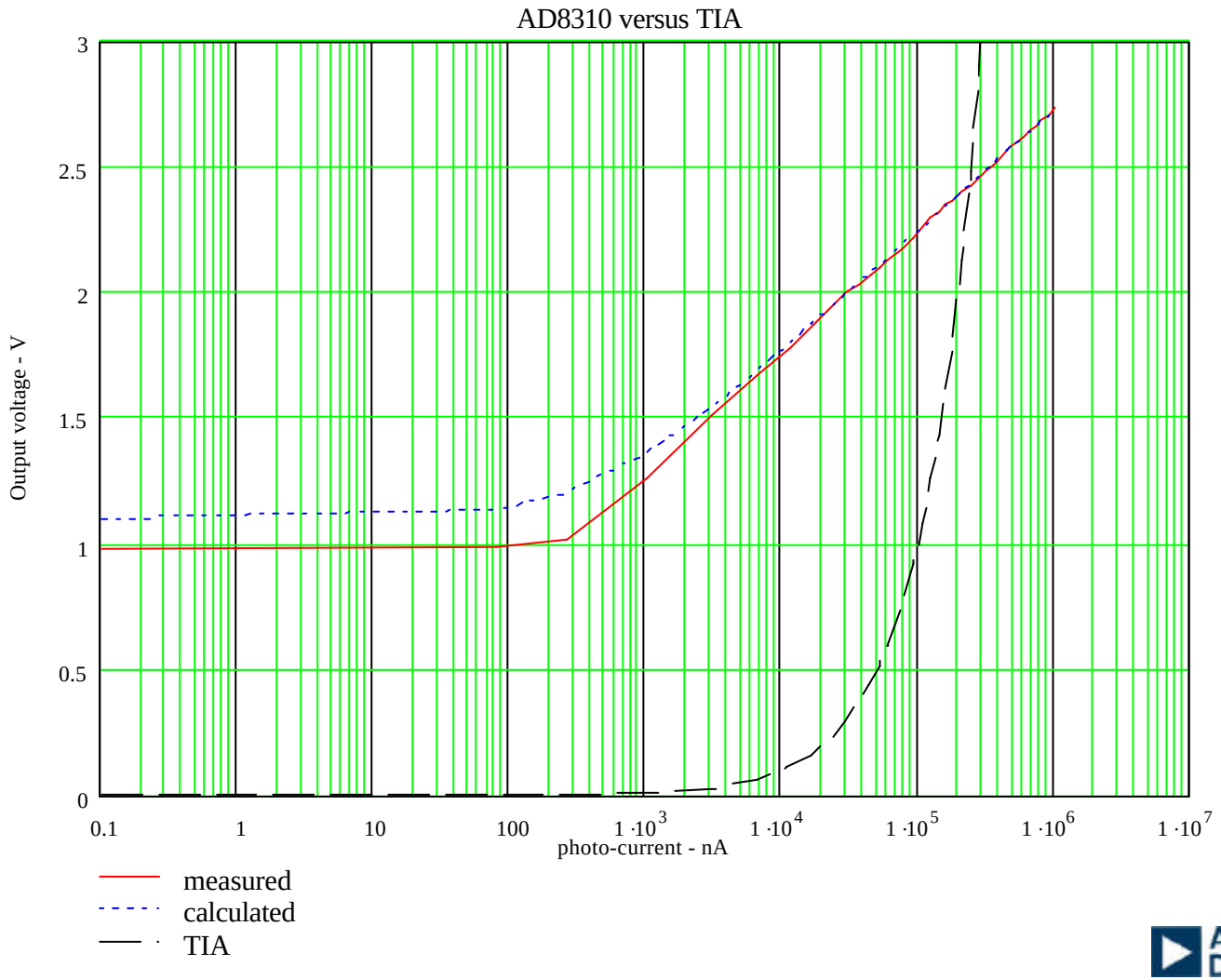


AD8310 EO Power Monitoring Application



ANALOG DEVICES

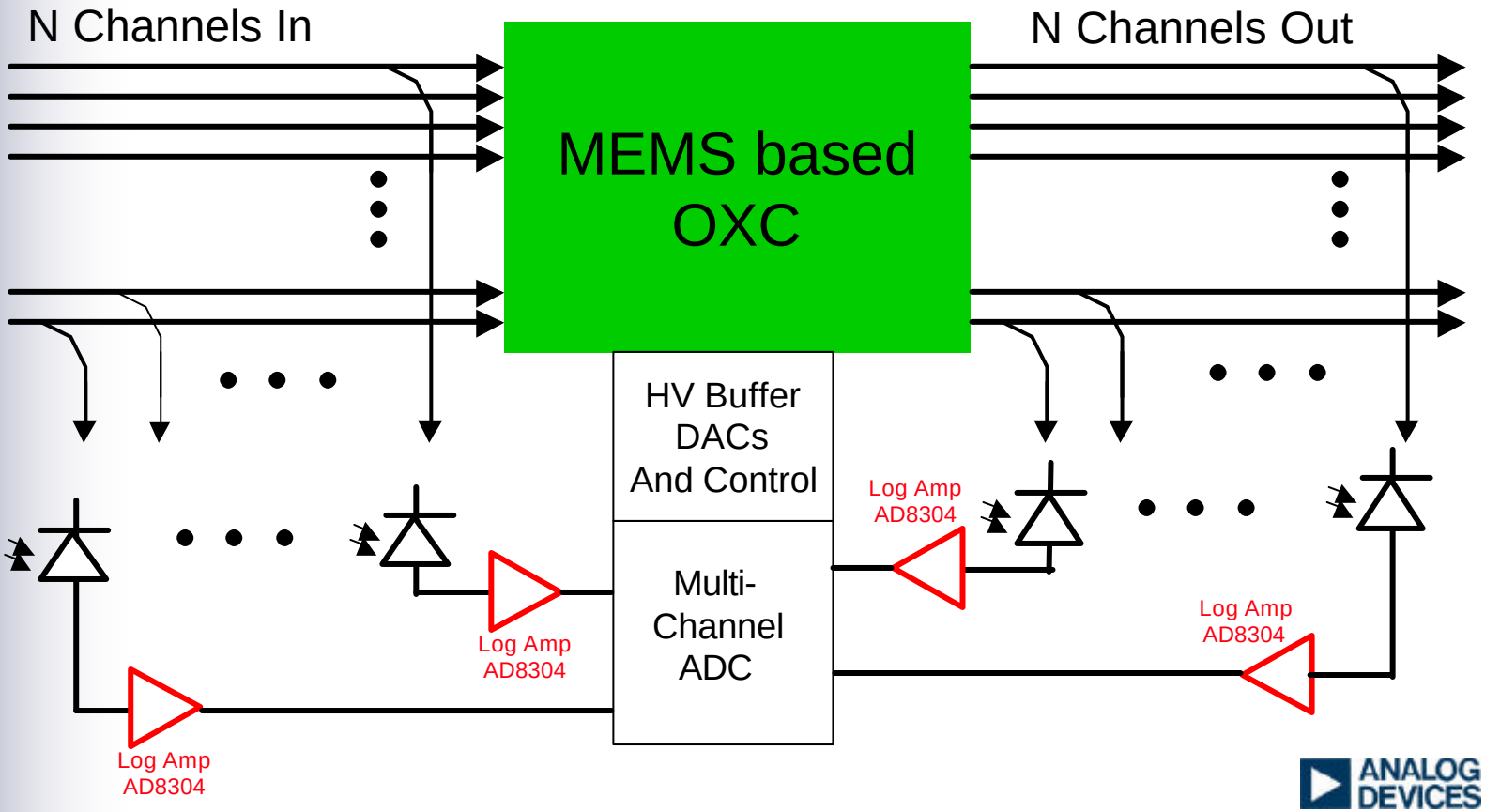
AD8310 versus Classical TIA



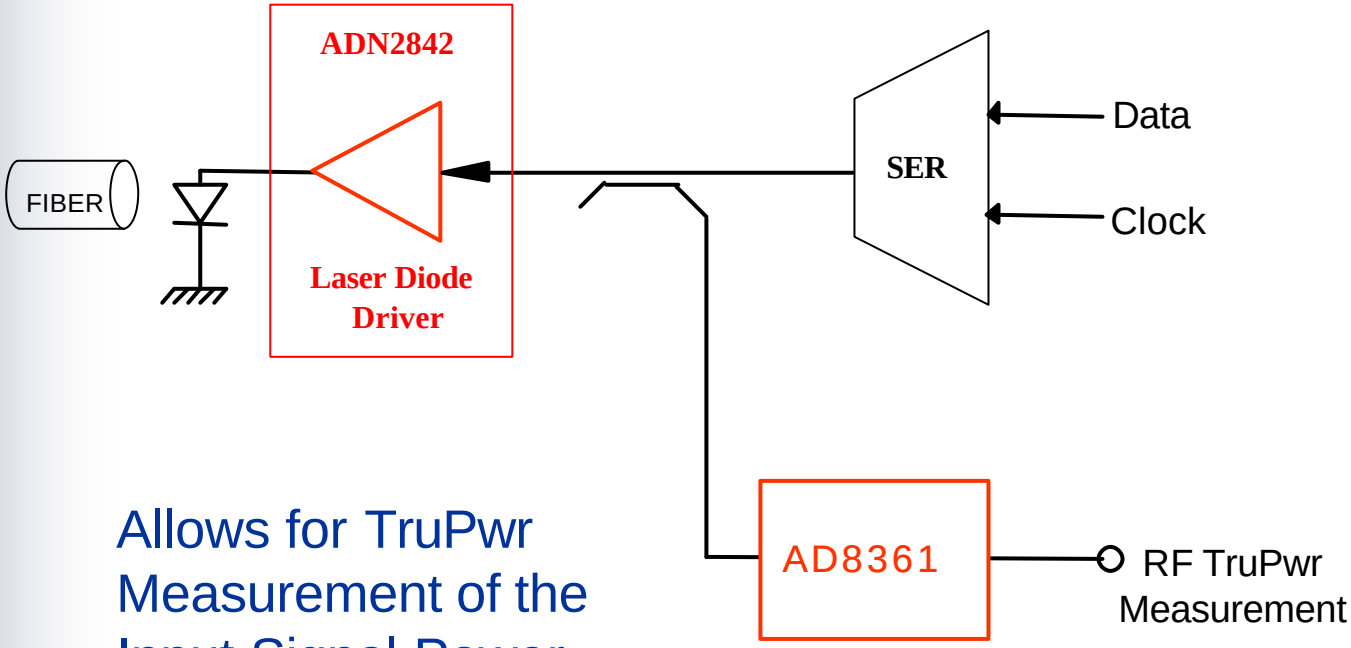
ANALOG DEVICES

Power Monitoring for Optical Switching

N x N scalable



AD8361 RFIN Power Measurement for OC-48



Allows for TruPwr Measurement of the Input Signal Power

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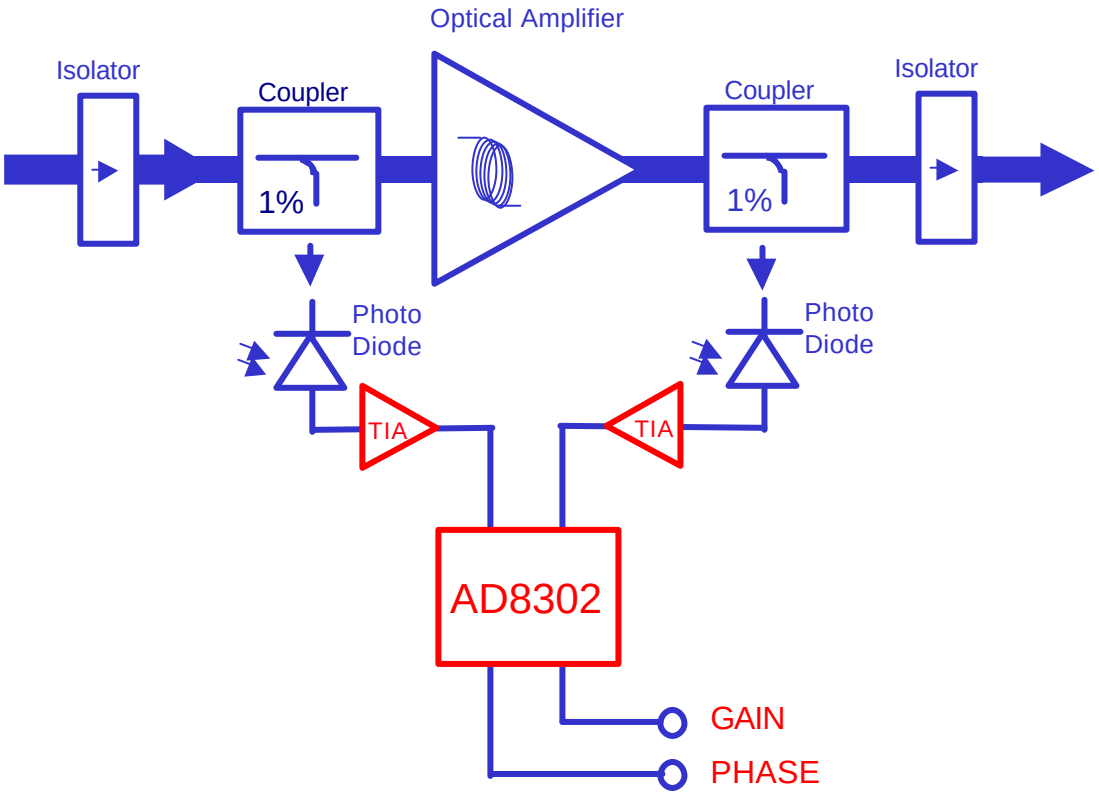
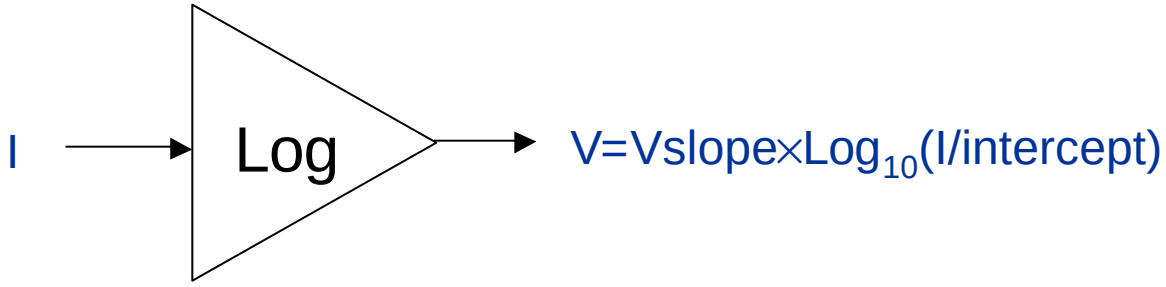
AD8302 Gain and Phase Measurement OC-1 to OC-48



ANALOG DEVICES

Fiber-Optimized M&C - AD8304 Log Converter

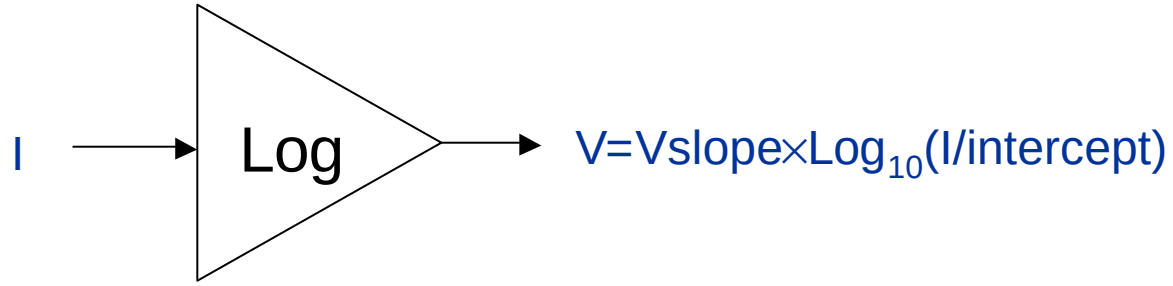


Applications

- General Optical Power Monitoring
  - OADM
  - Optical Switching QOS
  - OTDR Test Equipment
- Transmit Laser Module Power Control
- Optical Amplification
  - Gain Profile Equalization in EDFAs
  - Pump Laser Power Control

ANALOG DEVICES

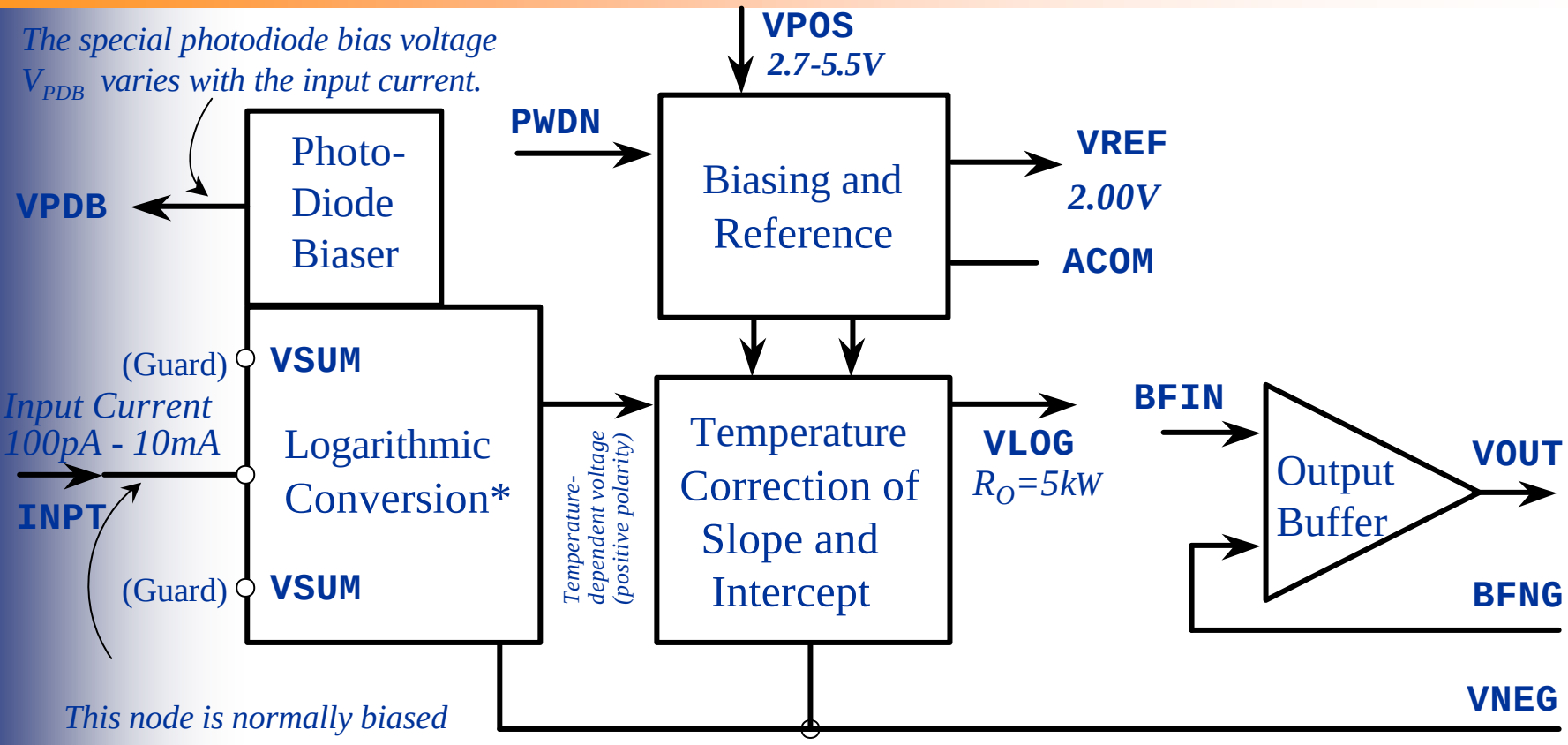
AD8304 160 dB Range Logarithmic Converter



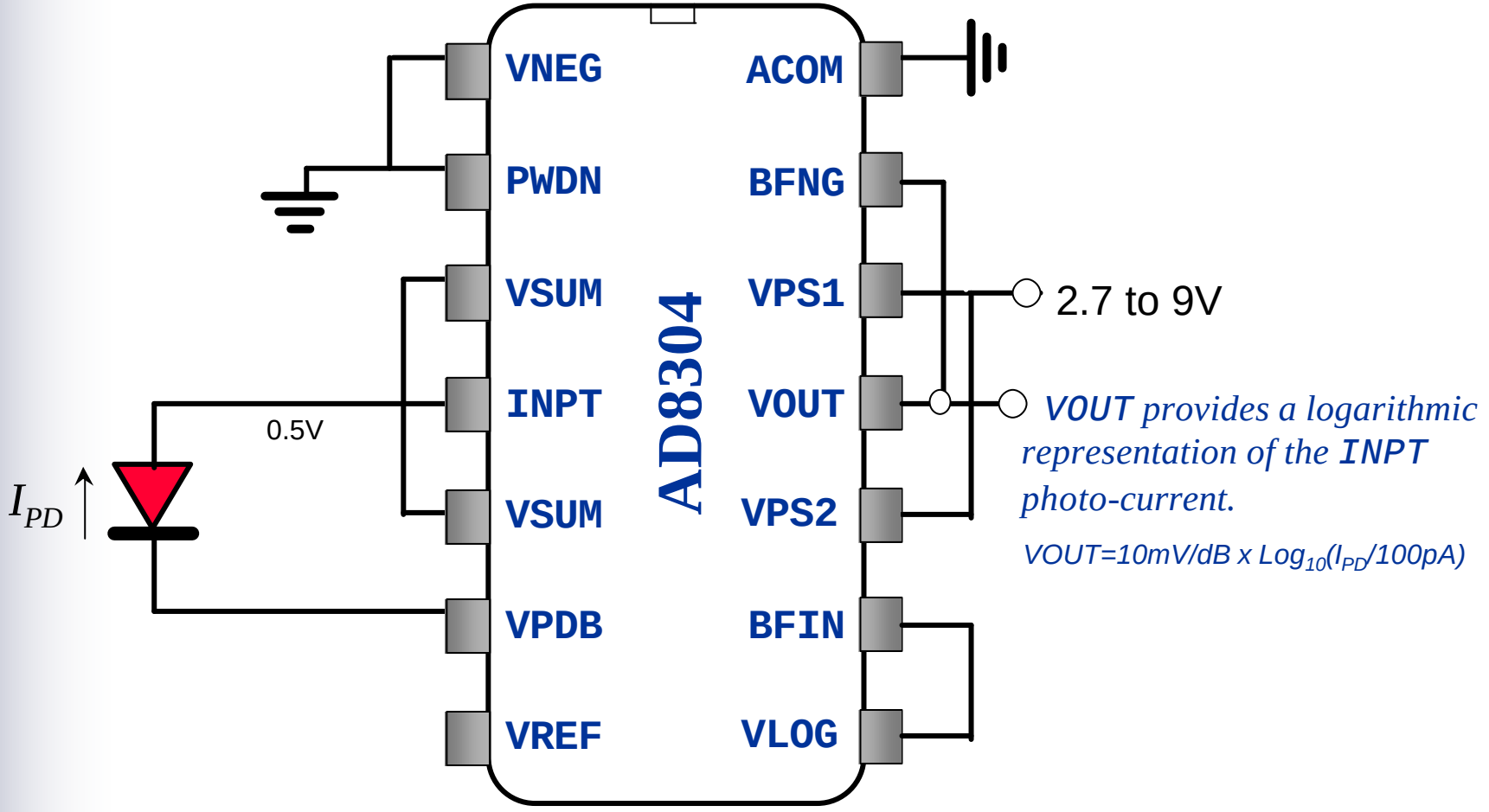
- Translinear Log Amp Design
- Wide Dynamic Range (100pA to 10mA)
- Converts Photo-current to Decibel Metric
- Adjustable Slope and Intercept
- Precision 2.00V Reference
- Adaptive Photodiode Bias
- Comparator and Alarm Mode
- Filter Friendly Architecture

ANALOG DEVICES

AD8304 Block Diagram



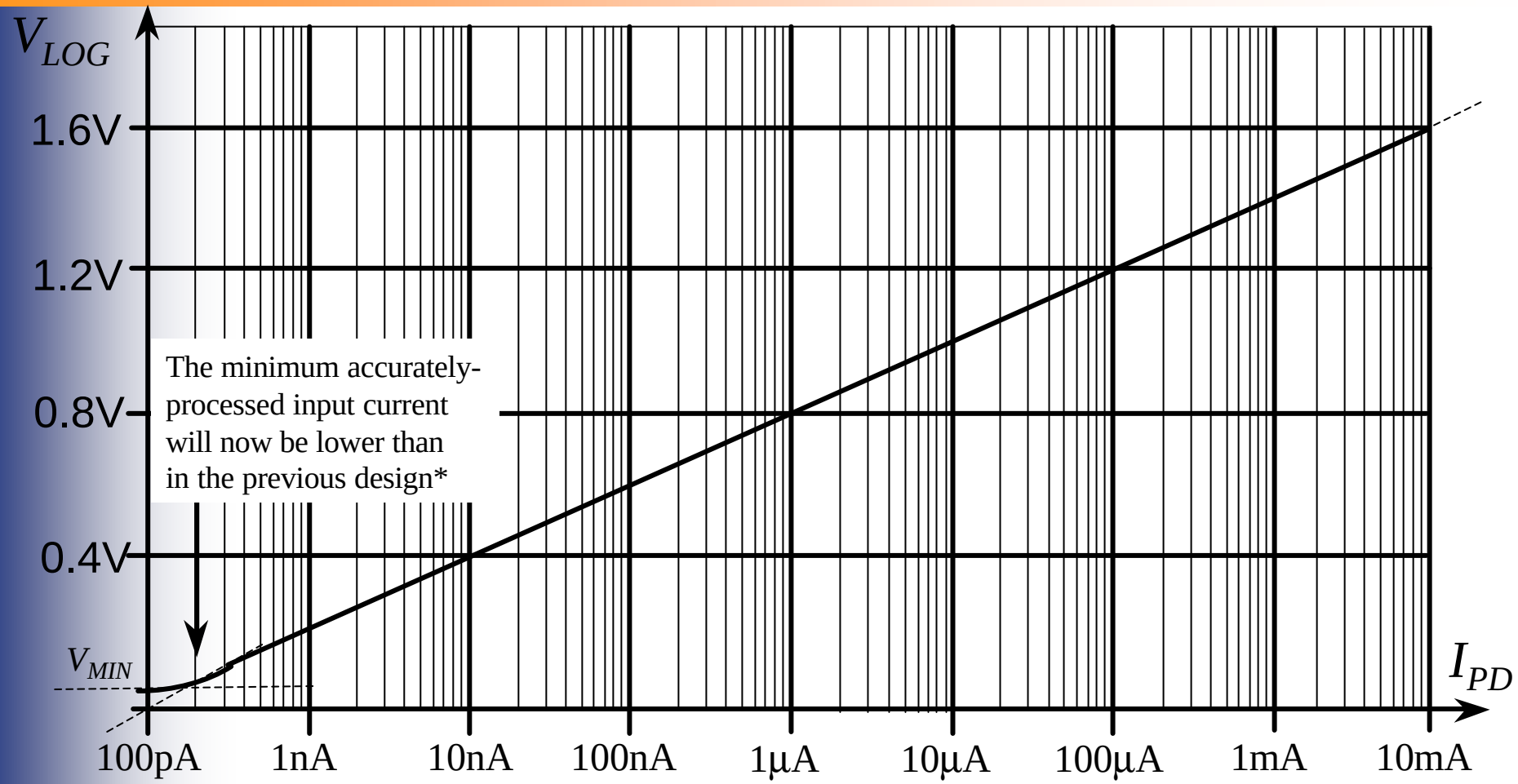
AD8304
Typical Application



Adaptive Photodiode Biasing

ANALOG DEVICES

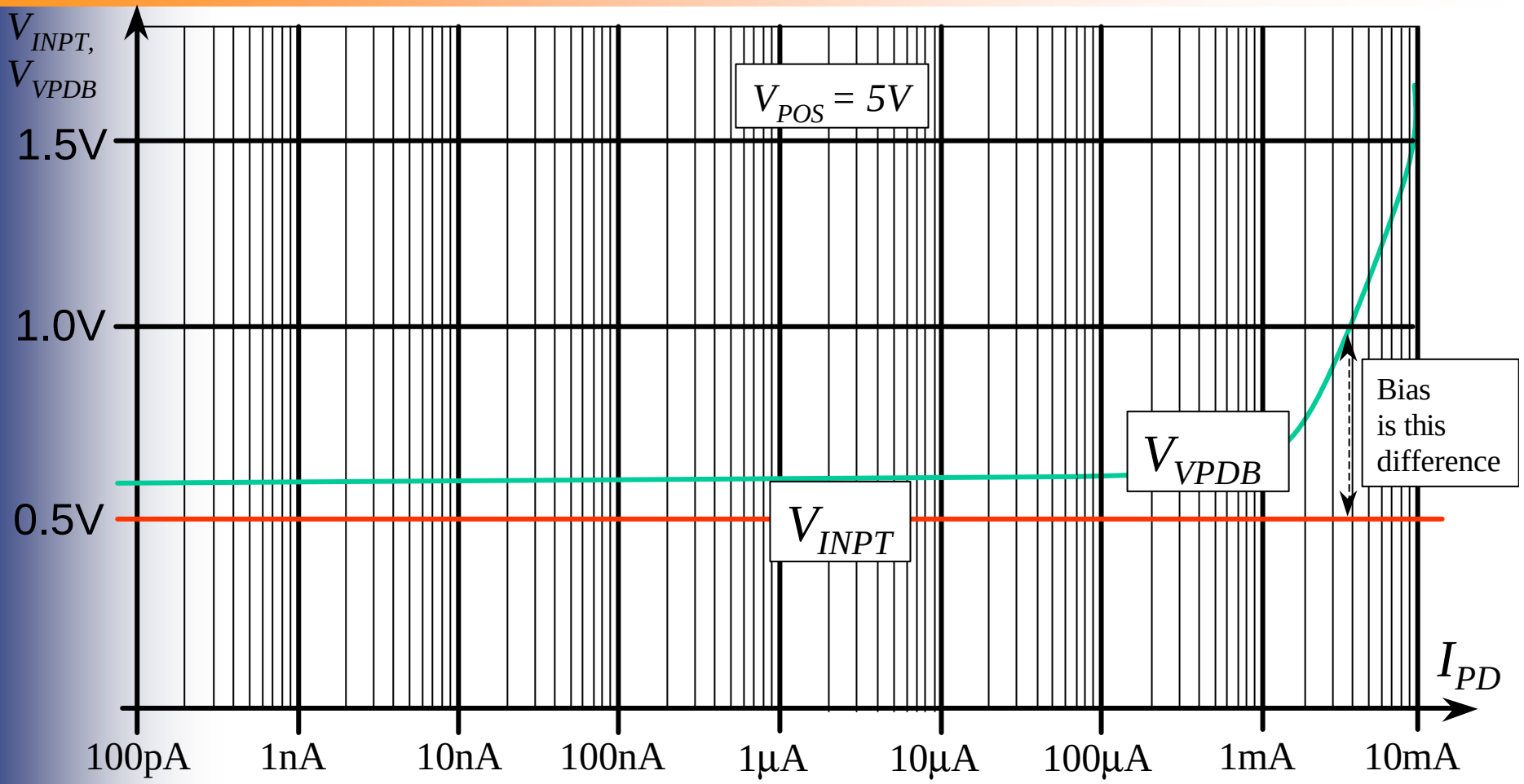
AD8304 Log Transfer Function



Basic Calibration of the AD8304 at VLOG output. V_{LOG} is from a source resistance of 5kΩ, and the slope of 10mV/dB can be gained up to any value using the buffer.

ANALOG DEVICES

AD8304 Photodiode Biaser Function



Input voltage and Photodiode bias voltage of the 8304; these are independent of the final Slope and Intercept.

ANALOG DEVICES