

Target Specification VSC7913

Photodetector/Transimpedance Amplifier
for SDH/SONET Optical Communication

Features

- Integrated Short Wavelength Photodetector/Transimpedance Amplifier Optimized for High Speed Optical Communications Applications
- SDH/SONET 622Mb/s Compatible
- High Bandwidth
- Low Input Noise Equivalent Power
- Large Optically Active Area
- Single 5V Power Supply

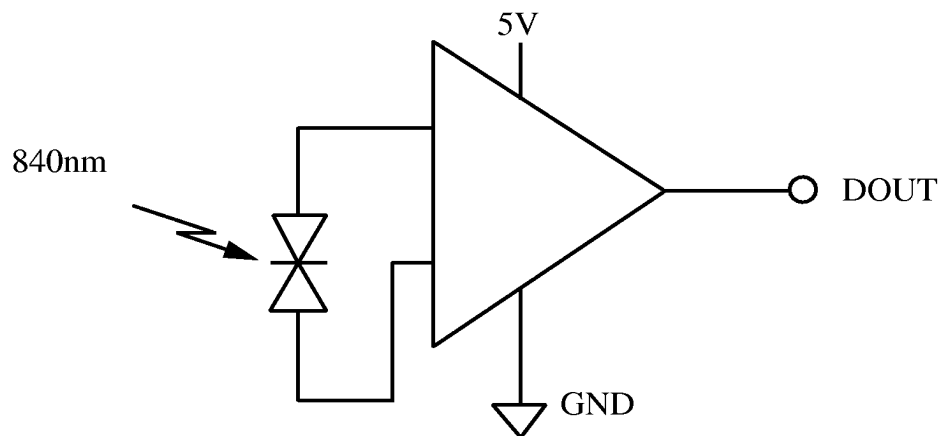
General Description

The VSC7913 integrated Photodetector/Transimpedance Amplifier provides a highly integrated solution for converting light from a fiber optic communications channel into a output voltage. The benefits of Vitesse Semiconductor's Gallium Arsenide H-GaAs process are fully utilized to provide very high bandwidth and low noise in a product with a large optically active area for easy alignment. Parts are available in either die form, flat-windowed packages or in ball-lens packages.

By using a metal-semiconductor-metal (MSM) photodetector with a monolithic integrated transimpedance amplifier, the input capacitance is lowered which allows for a larger optically active area than in discrete photodetectors. Integration also allows superior tracking over process, temperature and voltage between the photodetector and the amplifier, resulting in higher performance.

VSC7913 Block Diagram

Photodetector/Transimpedance Amplifier



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Table 1: Electro-Optical Specifications⁽¹⁾

Symbol	Parameter	Min.	Typ. ⁽²⁾	Max.	Units	Conditions
V _{SS}	Supply Voltage	4.5	5.0	5.5	V	
I _{DD}	Supply Current	15	30	45	mA	
λ	Wavelength	700	840	850	nm	
BW	Optical Modulation Bandwidth	500			MHz	-3db, P = -15 dBm ⁽³⁾
S	Sensitivity	-21	-23		dBm	
R _o	Single Ended Output Impedance	30	50	60	Ω	
R _d	Responsivity	1.2			mV/ μ W	R _{load} = 50 Ω P = -15 dBm @ 50MHz
V _{dc}	Output Bias Voltage		1.5		V	
V _{no}	Output Noise Voltage			0.88	mV rms	P = 0mW
----	Optically Active Area		100		μ m	Diameter

Notes: (1) Specified over 0°C to 85°C (case)

(2) Typical conditions 25°C (case) and 5V power supply.

(3) P = Incident Optical Power

Table 2: Absolute Maximum Ratings

Symbol	Parameter	Limits
V _{SS}	Power Supply	6V
T _{stg}	Storage Temperature	-55°C to 125°C (case temperature under bias)
H _{stg}	Storage Humidity	5 to 95%R.H. (Including Condensation)
H _{op}	Operating Humidity	8 to 80%R.H. (Excluding Condensation)
P _{inc}	Incident Optical Power	+3 dBm
IS	Impact Shock	500 G. Half Sine Wave Pulse Duration 1 +/-0.5 ms 3 Blows in each direction
V _{ib}	Vibration	20 > 2000 > 20 Hz, 10 Minutes 10 G. Peak Acceleration 4 Complete Cycles, 3 Perpendicular Axes

Table 3: Recommended Operating Conditions

Symbol	Parameter	Limits
V _{SS}	Power Supply	4.5V - 5.5V (5.0 nominal)
T _{op}	Operating Temperature	-40°C to 85°C Case
P _{max}	Maximum Optical Power	0 dBm

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Table 4: Pin Table Specifications for TO-46(ball lens), TO-56 (flat window) Packages and Bare Die

Symbol	Description
DOUT	Data output normal (with reference to incident light)
VSS	Positive Power supply
GND	Ground (package case)

Note: Pin Diagram is identical for both TO-46 and TO-56 package styles.

Figure 1: Pin Diagram

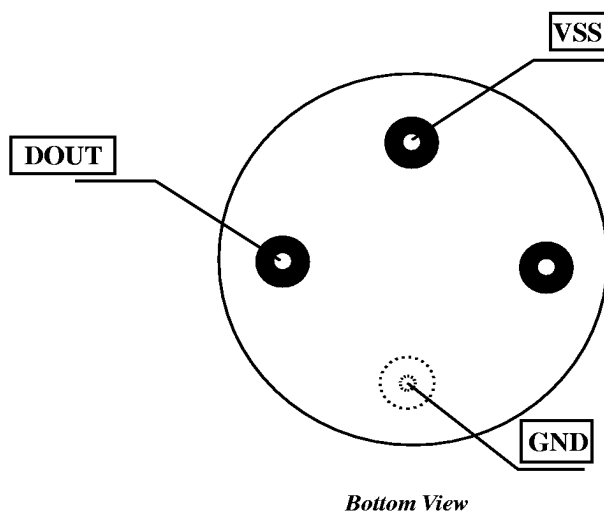
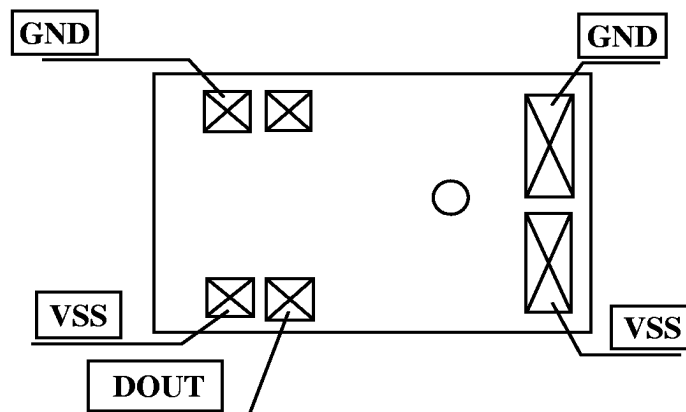
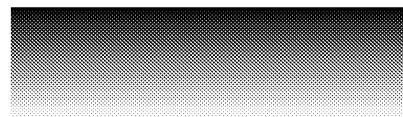
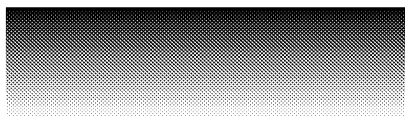


Figure 2: Schematic View of Bare Die Pad Assignments





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