

Please read this data sheet before purchasing, and keep it on file for future reference. It contains important information on the product specifications.

**Optocom**

**Optoelectronics Group**

**OPT1185-5.Ø**

**OC-3 Optical Receiver  
with Clock Recovery**

**Data Sheet**

**2004/5**



210 Andover Street, Wilmington, MA 01887

# Contents

General	3	Description
	3	Applications
	3	Standards Met
Features	3	Operation
	3	User Options and Assurance
Ratings	3	Absolute Maximum Ratings
Operating Characteristics	4	Optical
	4	Electrical
	5	Data/Clock Alignment
Physical	5	Pin Designations
	6	Outline Diagram
	6	Dimensions
	7	Connections
Safety	7	Optical
	7	Electrical
	7	Other
Appendix	8	Terms
Additional Information	8	Contact

**© 1999-2005 Optocom Corporation.** All rights reserved. Reproduction in whole or in part is prohibited without prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract and is believed to be accurate and reliable and may be subjected to change without notice. No liability will be accepted by the publisher for any consequence of its use.

## General

### Description

The OPT1185-5.Ø is a 20-pin DIP fiber optic receiver module which converts lightwaves in the 1310/1550 nm band to electrical data signals at a data rate of 155.52 Mbps. The receiver has a hermetically sealed InGaAs photodiode aligned to a multimode fiber.

### Applications

The device is designed for data communication systems and telecommunication transmission systems over singlemode or multimode fiber.

### Standards Met

The specifications met are: the SONET/SDH STS-3/STM-1 interface, the Long Reach OC-3 Optical Parameters (LR-1, LR-2 & LR-3) of Bellcore GR-253-CORE, the Long-haul Recommendation (L-1.1, L-1.2 & L-1.3) of ITU-T G.957, and the monitor & alarm requirements of Bellcore GR-253-CORE & ITU-T G.783 and G.958.

## Features

### Operation

The OPT1185-5.Ø optical receiver operates using a single +5 V power supply. The device maintains electrical and optical stability over the specified temperature and voltage ratings. Outputs include data & clock signals and signal detect (SD).

### User Options and Assurance

Operator can measure the photocurrent generated in response to the incoming optical signal. The photocurrent can be calculated based on the voltage drop across an external resistor connected between the monitoring pin 10 and +5 V. If photocurrent measurement is not required, pin 10 should be connected to a +5 V power supply directly.

Every device is optically and electrically tested to ensure highest performance and reliability.

## Ratings

### Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V <sub>CC</sub>	0	6.0	V
Operating Case Temperature Range	T <sub>C</sub>	-40	85	°C
Operating Relative Humidity (non-condensing)	H <sub>OP</sub>	---	85	%
Lead Soldering Temperature/Time	T/t	---	250/10	°C/s
Minimum Fiber Bend Radius	R <sub>F</sub>	32/1.25	---	mm/in.
Storage Case Temperature Range	T <sub>STG</sub>	-40	85	°C

# Operating Characteristics

## Optical

Parameter	Symbol	Min	Typ	Max	Unit
Input Wavelength	$\lambda$	1260	---	1580	nm
Measured Average Sensitivity <sup>1</sup>	$P_{RL}$	-36.0	-37.5	---	dBm
Maximum Input Power	$P_{RH}$	-3	---	---	dBm
<b>Signal Detect Threshold:</b>					
Decreasing Light Input	$SDT_D$	-53	-43	-37	dBm
Increasing Light Input	$SDT_I$	-52	-40	-36	dBm
Hysteresis	$SDT_H$	---	2	---	dBm
Photodiode Responsivity <sup>2</sup>	$PD_R$	0.8	---	1.0	A/W

<sup>1</sup> At a BER of  $1 \times 10^{-10}$  and an extinction ratio of 10 dB or more.

<sup>2</sup> Photocurrent 1 = Responsivity x Mean Power.

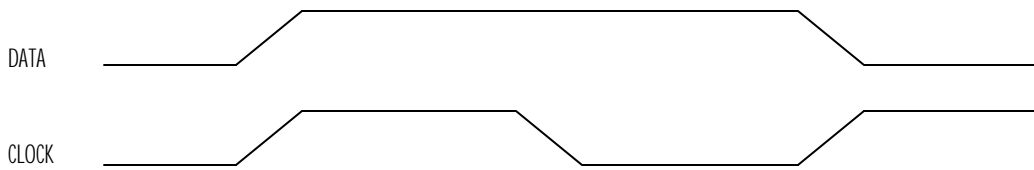
## Electrical

Parameter	Symbol	Min	Typ	Max	Unit
dc Power Supply Voltage	$V_{CC}$	4.75	5.0	5.25	V
dc Power Supply Current	$I_{CC}$	50	---	300	mA
<b>Output Voltage:<sup>1</sup></b>					
Low	$V_{OL}$	-2.0	-1.8	-1.7	V
High	$V_{OH}$	-1.2	-1.0	-0.7	V
Output Transition Time <sup>2</sup>	$t_i$	---	---	1.7	ns
<b>Output Signal Detect Voltage:</b>					
Low	$V_{SDL}$	---	---	0.4	V
High	$V_{SDH}$	3.6	---	---	V
Clock/Data Alignment <sup>3</sup>	$T_{CDA}$	-0.8	---	+0.8	ns
Clock Duty Cycle		45	---	55	%
Output Clock Random Jitter	$J_C$	---	1.2	3.6	° RMS
Output Clock Jitter Peaking	$J_P$	0.04	0.05	0.06	dB
<b>Signal Detect Response Time<sup>4</sup></b>					
Decreasing Light Input <sup>4</sup>	$SDRT_D$	10	---	100	$\mu$ s
Increasing Light Input <sup>5</sup>	$SDRT_I$	10	---	100	$\mu$ s

## Operating Characteristics - continued

- <sup>1</sup> Output measured from  $V_{CC}$  with  $50\Omega$  load to  $[V_{CC} - 2.0]$  V.
- <sup>2</sup> Between 10% and 90% (50% duty cycle).
- <sup>3</sup> Data transition relative to the rising edge of CLOCK.
- <sup>4</sup> Measured from the onset of an all-zeros pattern lasting 100  $\mu$ s or longer (see GR-253-CORE). The SD output shall not respond to an all-zeros pattern lasting less than 2.3  $\mu$ s.
- <sup>5</sup> Measured from the transition to a pseudorandom ( $2^{23} - 1$  polynomial) word having a 50% duty cycle and an average optical input power,  $P_I$ , where  $P_{RL} \leq P_I \leq P_{RH}$ , from a pre-existing all-zeros pattern of 100  $\mu$ s or longer duration (see GR-253-CORE).

## Receiver Output Data/Clock Alignment



## Physical

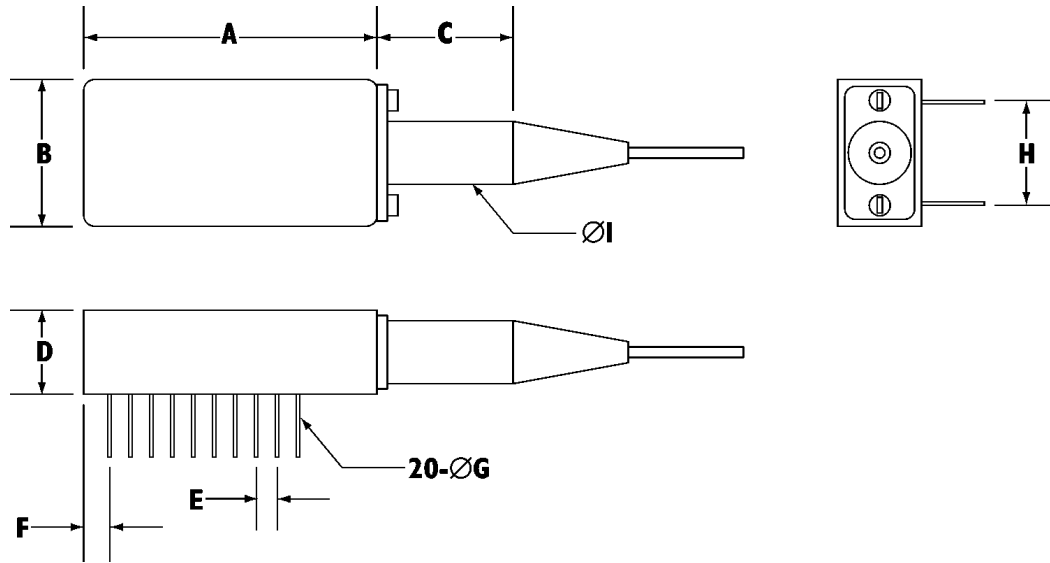
### Pin Designations

<b>Pin</b>	1	2	3	4	5	6	7	8	9	10
	GND	GND	GND	CLOCK(+)	CLOCK(-)	GND	DATA(+)	GND	DATA(-)	PD Bias
<b>Pin</b>	20	19	18	17	16	15	14	13	12	11
	NC	NC	NC	NC	GND	GND	FLAG(-)	GND	FLAG(+)	$V_{CC}$

## Physical - continued

The device package conforms to the 20-pin DIP outline shown below.

### Outline Diagram



### Dimensions

Dimension	Typ	
	Inches	Metric (mm)
A	1.300	33.0
B	0.635	16.13
C	1.22	30.99
D	0.365	9.27
E	0.100	2.54
F	0.110	2.79
ØG	0.018	0.46
H	0.400	10.16
ØI	0.244	6.20

## Physical - continued

An assigned serial number in both barcode and human readable formats appear on the device.

All markings and labels are permanent and meet the requirements of MIL-STD-883C-2015.7.

## Connections

The pigtail consists of a multimode (MM) fiber with a 50  $\mu\text{m}$  core. The outer jacket has a nominal 900  $\mu\text{m}$  diameter and is terminated with an ST<sup>®\*</sup>, FC, or SC Connector. The minimal pigtail length is 1 meter (39.4 inches) long.

\*ST<sup>®</sup> is a registered trademark of AT&T

## Safety

Please embrace all customary precautions & discretion while handling this device.

<b>Optical</b>	<ul style="list-style-type: none"><li>• Avoid direct eye exposure to laser beam projection area or a broken fiber under operation.</li></ul>
<b>Electrical</b>	<ul style="list-style-type: none"><li>• Warning against excessive overvoltages or current surges as these may cause failure or electrical shock.</li><li>• Solder leads to electronics entirely so as to eschew short circuits.</li><li>• Solder or plug in device while power is turned off.</li></ul>
<b>Other</b>	<ul style="list-style-type: none"><li>• Avoid storage above maximum temperature rating &amp; other extreme conditions.</li><li>• Avoid device disassembly as damages may be incurred.</li><li>• Avoid excessive force to fiber pigtail and bending beyond a 30 mm radius.</li><li>• Take normal handling precautions as for all electrostatic sensitive devices.</li></ul>

# Appendix

## Terms

BER: Bit Error Rate

SD: indicates the presence of an incoming signal level that has a workable BER

GND: Ground

NC: not connected

## Additional Information

### Contact

For additional information, product specifications, or information about Optocom:

Internet: <http://www.optocom.com>

Email: [Info@optocom.com](mailto:Info@optocom.com)

Tel: +1 978 988 8711

Fax: +1 978 988 8722