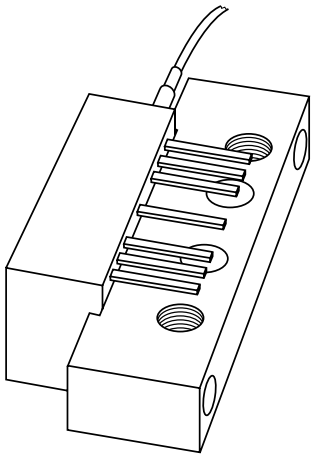
# DATA SHEET



# BGE887BO
## Optical receiver module

Product specification
Supersedes data of 2000 Apr 10

2001 Sep 27

Philips
Semiconductors

PHILIPS

# Optical receiver module BGE887BO

## FEATURES

- Excellent linearity
- Extremely low noise
- Excellent flatness
- Standard CATV outline
- Rugged construction
- Gold metallization ensures excellent reliability.

## APPLICATIONS

- CATV systems operating in the 40 to 860 MHz frequency range.

## DESCRIPTION

Hybrid high dynamic range optical receiver module in a SOT115U package operating at a voltage supply of +24 V (DC). The module contains a monomode optical input suitable for wavelengths from 1290 to 1600 nm, a terminal to monitor the pin diode current and an electrical output with an impedance of 75 Ω.

## PINNING - SOT115U

| PIN | DESCRIPTION |
|---|---|
| 1 | monitor current |
| 2 | common |
| 3 | common |
| 5 | $+V_B$ |
| 7 | common |
| 8 | common |
| 9 | output |

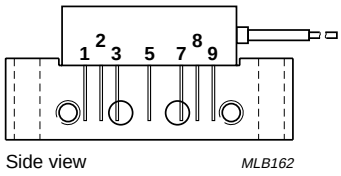



Fig.1 Simplified outline.

## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| f | frequency range | | 40 | 860 | MHz |
| $S_{22}$ | output return losses | f = 40 to 860 MHz | 11 | – | dB |
| | optical input return losses | | 45 | – | dB |
| $d_2$ | second order distortion | f = 324.25 MHz | – | –70 | dBc |
| F | equivalent noise input | f = 40 MHz | – | 7 | pA/√Hz |
| $I_{tot}$ | total current consumption (DC) | $V_B$ = 24 V | 175 | 205 | mA |

## HANDLING

Fibreglass optical coupling: maximum tensile strength = 5 N; minimum bending radius = 35 mm.

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| f | frequency range | | 40 | 860 | MHz |
| $T_{stg}$ | storage temperature | | –40 | +85 | °C |
| $T_{mb}$ | operating mounting base temperature | | –20 | +85 | °C |
| $P_{in}$ | optical input power | continuous | – | 5 | mW |
| ESD | ESD sensitivity | human body model; R = 1.5 kΩ; C = 100 pF | 500 | – | V |

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 860 MHz; $V_B$ = 24 V; $T_{mb}$ = 30 °C; $Z_S = Z_L$ = 75 Ω

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| S | responsivity | λ = 1300 nm | 800 | – | V/W |
| $V_{pin\ 1}$ | pin 1 monitor voltage | λ = 1300 nm | 0.75 | 1 | V/mW |
| FL | flatness of frequency response | | – | ±0.5 | dB |
| $S_{22}$ | output return losses | f = 40 to 860 MHz | 11 | – | dB |
| | optical input return losses | | 45 | – | dB |
| $d_2$ | second order distortion | note 1 | – | –70 | dB |
| $d_3$ | third order distortion | note 2 | – | –80 | dB |
| F | equivalent noise input | f = 40 MHz | – | 7 | pA/√Hz |
| $s_\lambda$ | spectral sensitivity | λ = 1310 ±20 nm | 0.85 | – | A/W |
| | | λ = 1550 ±20 nm | 0.9 | – | A/W |
| λ | optical wavelength | | 1290 | 1600 | nm |
| L | length of optical fibre | fibre; SM type; 9/125 µm | 1 | – | m |
| $I_{tot}$ | total current consumption (DC) | note 3 | 175 | 205 | mA |

**Notes**

1. Two laser test; each laser with 40% modulation index; $f_p$ = 135 MHz; $P_p$ = 0.5 mW; $f_q$ = 189.25 MHz; $P_q$ = 0.5 mW; measured at $f_p + f_q$ = 324.25 MHz.
2. Three laser test; each laser with 40% modulation index; $f_p$ = 326.25 MHz; $P_p$ = 0.33 mW; $f_q$ = 333.25 MHz; $P_q$ = 0.33 mW; $f_r$ = 335.25 MHz; $P_r$ = 0.33 mW; measured at $f_p + f_q - f_r$ = 324.25 MHz.
3. The module normally operates at $V_B$ = 24 V but is able to withstand supply transients up to 30 V.

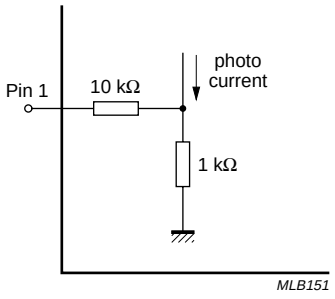
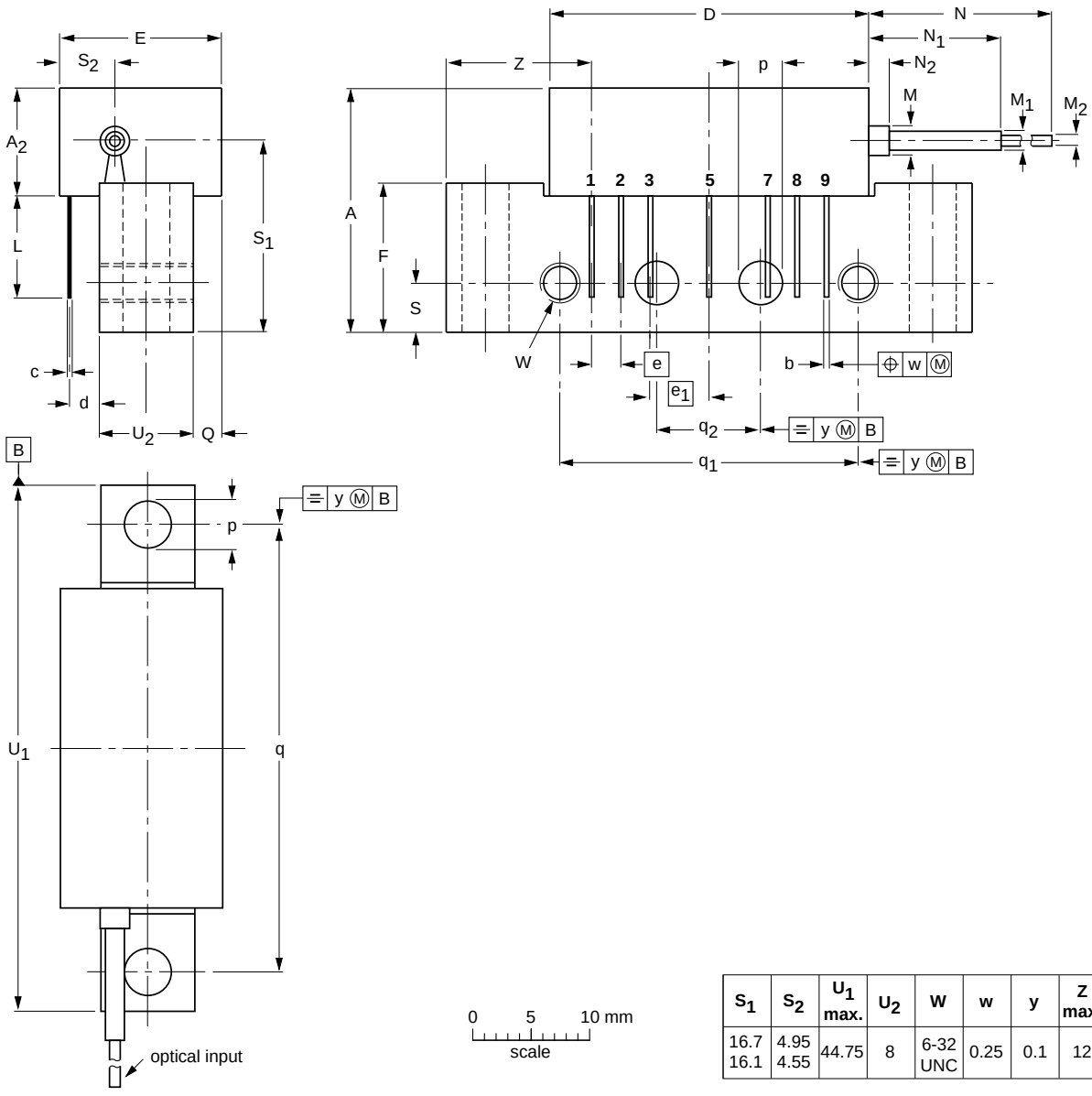



Fig.2 Monitor current pin.

## PACKAGE OUTLINE

**Rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes; optical input; 7 gold-plated in-line leads** **SOT115U**




| $S_1$ | $S_2$ | $U_1$ max. | $U_2$ | W | w | y | Z max. |
|---|---|---|---|---|---|---|---|
| 16.7<br>16.1 | 4.95<br>4.55 | 44.75 | 8 | 6-32 UNC | 0.25 | 0.1 | 12 |

**DIMENSIONS (mm are the original dimensions)**

| UNIT | A max. | $A_2$ max. | b | c | D max. | d max. | E max. | e | $e_1$ | F | L min. | M | $M_1$ | $M_2$ | N min. | $N_1$ max. | $N_2$ max. | p | Q max. | q | $q_1$ | $q_2$ | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 20.8 | 9.1 | 0.51<br>0.38 | 0.25 | 27.2 | 2.54 | 13.75 | 2.54 | 5.08 | 12.7 | 8.8 | 2.5 | 1.6 | 0.9 | 1000 | 10.7 | 5 | 4.15<br>3.85 | 2.4 | 38.1 | 25.4 | 10.2 | 4.2 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | EIAJ | | | |
| SOT115U | | | | | | ~~99-04-13~~<br>01-08-10 |

**DATA SHEET STATUS**

| DATA SHEET STATUS[1] | PRODUCT STATUS[2] | DEFINITIONS |
|---|---|---|
| Objective data | Development | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice. |
| Preliminary data | Qualification | This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product. |
| Product data | Production | This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A. |

**Notes**

1. Please consult the most recently issued data sheet before initiating or completing a design.
2. The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

**DEFINITIONS**

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

**Application information** — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

**DISCLAIMERS**

**Life support applications** — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

**Right to make changes** — Philips Semiconductors reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance. Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no licence or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

| CAUTION |
|---|
| This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B. |

**NOTES**

**NOTES**

# *Philips Semiconductors – a worldwide company*

**Contact information**

For additional information please visit **http://www.semiconductors.philips.com**. Fax: **+31 40 27 24825**
For sales offices addresses send e-mail to: **sales.addresses@www.semiconductors.philips.com**.



Printed in The Netherlands 613518/05/pp8 Date of release: 2001 Sep 27 Document order number: 9397 750 08694

Let's make things better.

Philips Semiconductors

PHILIPS