

# BGO807; BGO807/FC0; BGO807/SC0

870 MHz optical receivers

Rev. 01 — 7 July 2004

Product data sheet

## 1. Product profile

### 1.1 General description

High dynamic range optical receiver amplifier modules in a standard SOT115 package where the non-jacketed fiber has either no connector or has an FC/APC or SC/APC connector.

The amplifier supply voltage pin and the photo diode bias voltage pin both connect to 24 V (DC).

The modules have a mono mode optical input suitable for 1290 nm to 1600 nm wavelengths, a terminal to monitor the photo diode current and an electrical output having a characteristic impedance of 75  $\Omega$ .

#### 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.

### 1.2 Features

- Excellent linearity
- Low noise
- Excellent flatness
- Standard CATV outline
- Rugged construction
- Gold metallization ensures excellent reliability
- High optical input power range.

### 1.3 Applications

- CATV optical node systems operating in the 40 MHz to 870 MHz frequency range.

# PHILIPS

### 1.4 Quick reference data

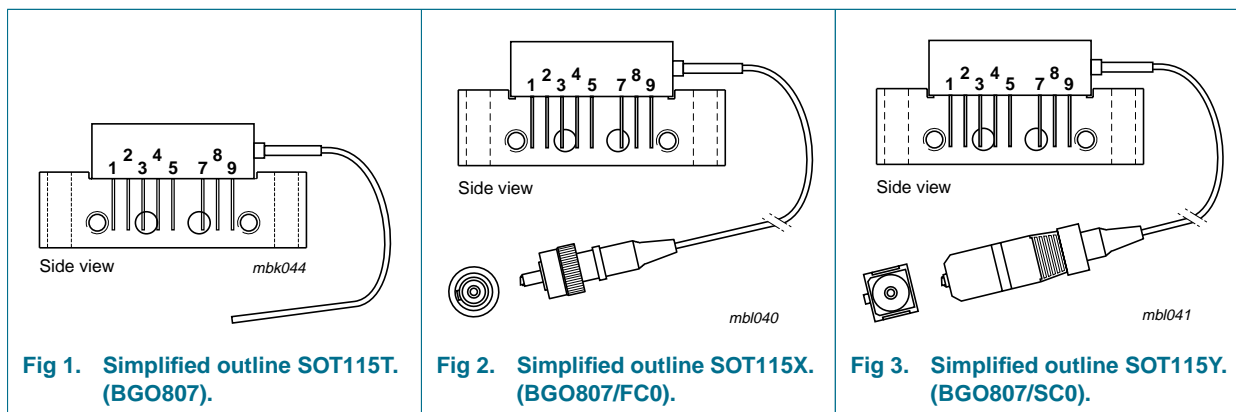
Table 1: Quick reference data

| Symbol           | Parameter                      | Conditions            | Min | Typ | Max | Unit   |
|------------------|--------------------------------|-----------------------|-----|-----|-----|--------|
| f                | frequency range                |                       | 40  | -   | 870 | MHz    |
| s <sub>22</sub>  | output return losses           | f = 40 MHz to 870 MHz | 11  | -   | -   | dB     |
|                  | optical input return losses    |                       | 45  | -   | -   | dB     |
| d <sub>2</sub>   | second order distortion        | f = 854.5 MHz         | -   | -   | -55 | dB     |
| F                | equivalent noise input         | f = 40 MHz to 870 MHz | -   | -   | 8.5 | pA/√Hz |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | 175 | -   | 205 | mA     |

## 2. Pinning information

Table 2: Pinning

| Pin | Description                        |
|-----|------------------------------------|
| 1   | monitor current                    |
| 2   | common                             |
| 3   | common                             |
| 4   | +V <sub>B</sub> of the photo diode |
| 5   | +V <sub>B</sub> of the amplifier   |
| 7   | common                             |
| 8   | common                             |
| 9   | output                             |



### 3. Ordering information

Table 3: Ordering information

| Type number | Package |  |         |
|-------------|---------|--|---------|
|             | Name    | Description  | Version |
| BGO807      | -       | rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 × 6-32 UNC and 2 extra horizontal mounting holes; optical input; 8 gold-plated in-line leads                | SOT115T |
| BGO807/FC0  | -       | rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 × 6-32 UNC and 2 extra horizontal mounting holes; optical input with connector; 8 gold-plated in-line leads | SOT115X |
| BGO807/SC0  | -       | rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 × 6-32 UNC and 2 extra horizontal mounting holes; optical input with connector; 8 gold-plated in-line leads | SOT115Y |

### 4. Limiting values

Table 4: Limiting values

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

| Symbol           | Parameter                           | Conditions                                  | Min | Max | Unit |
|------------------|-------------------------------------|---|-----|-----|------|
| f                | frequency range                     |   | 40  | 870 | MHz  |
| T <sub>stg</sub> | storage temperature                 |   | -40 | +85 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature |   | -20 | +85 | °C   |
| P <sub>in</sub>  | optical input power                 | continuous                                  | -   | 5   | mW   |
| ESD              | ESD sensitivity                     | human body model;<br>R = 1.5 kΩ; C = 100 pF | 500 | -   | V    |

### 5. Characteristics

Table 5: Characteristics

In accordance with the Absolute Maximum Rating System (IEC 60134); bandwidth 40 MHz to 870 MHz; V<sub>B</sub> = 24 V; T<sub>mb</sub> = 30 °C; Z<sub>L</sub> = 75 Ω.

| Symbol          | Parameter                   | Conditions                  | Min                                     | Typ                   | Max | Unit |     |
|-----------------|-----------------------------|-----------------------------|---|-----------------------|-----|------|-----|
| S               | responsivity                | BGO807                      | λ = 1300 nm                             | 800                   | -   | -    | V/W |
|                 |                             | BGO807/FC0; BGO807/SC0      | λ = 1300 nm                             | 750                   | -   | -    | V/W |
|                 |                             | FL                          | flatness straight line (peak to valley) | f = 40 MHz to 870 MHz | -   | -    | 1   |
| SL              | slope straight line         | f = 40 MHz to 870 MHz       | 0                                       | -                     | 2   | dB   |     |
| s <sub>22</sub> | output return losses        | f = 40 MHz to 870 MHz       | 11                                      | -                     | -   | dB   |     |
|                 | optical input return losses |                             | 45                                      | -                     | -   | dB   |     |
| d <sub>2</sub>  | second order distortion     | f <sub>m</sub> = 446.5 MHz  | [1] [2]                                 | -                     | -   | -66  | dB  |
|                 |                             | f <sub>m</sub> = 746.5 MHz  | [1] [3]                                 | -                     | -   | -61  | dB  |
|                 |                             | f <sub>m</sub> = 854.5 MHz  | [1] [4]                                 | -                     | -   | -55  | dB  |
| d <sub>3</sub>  | third order distortion      | f <sub>m</sub> = 853.25 MHz | [5] [6]                                 | -                     | -   | -71  | dB  |

**Table 5: Characteristics ...continued**

In accordance with the Absolute Maximum Rating System (IEC 60134); bandwidth 40 MHz to 870 MHz;  $V_B = 24$  V;  
 $T_{mb} = 30$  °C;  $Z_L = 75$   $\Omega$ .

| Symbol            | Parameter  | Conditions                 | Min  | Typ | Max  | Unit                   |
|-------------------|--|----------------------------|------|-----|------|------------------------|
| F                 | equivalent noise input                                   | f = 40 MHz to 450 MHz      | -    | -   | 7    | pA/ $\sqrt{\text{Hz}}$ |
|                   |  | f = 450 MHz to 750 MHz     | -    | -   | 8    | pA/ $\sqrt{\text{Hz}}$ |
|                   |  | f = 750 MHz to 870 MHz     | -    | -   | 8.5  | pA/ $\sqrt{\text{Hz}}$ |
| $s_\lambda$       | spectral sensitivity                                     | $\lambda = 1310 \pm 20$ nm | 0.85 | -   | -    | A/W                    |
|                   |  | $\lambda = 1550 \pm 20$ nm | 0.9  | -   | -    | A/W                    |
| $\lambda$         | optical wavelength                                       |                            | 1290 | -   | 1600 | nm                     |
| L                 | length of optical fiber; SM type;<br>9/125 $\mu\text{m}$ | BGO807                     | 1    | -   | -    | m                      |
|                   |  | BGO807/FC0; BGO807/SC0     | 746  | -   | 861  | mm                     |
|                   |  |                            |      |     |      |                        |
| $I_{\text{tot}}$  | total current consumption (DC)                           |                            | 175  | -   | 205  | mA                     |
| $I_{\text{bias}}$ | diode bias current at pin 4 (DC)                         |                            | -    | -   | 25   | mA                     |

[1] Two laser test; each laser with a modulation index of 40%;  $P_{\text{opt}} = 1$  mW (total).

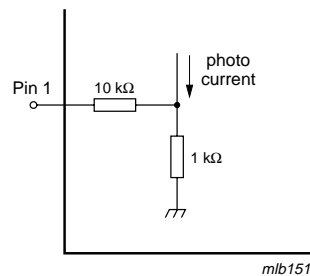
[2]  $f_m = 446.5$  MHz;  $f_p = 97.25$  MHz;  $f_q = 349.25$  MHz.

[3]  $f_m = 746.5$  MHz;  $f_p = 133.25$  MHz;  $f_q = 613.25$  MHz.

[4]  $f_m = 854.5$  MHz;  $f_p = 133.25$  MHz;  $f_q = 721.25$  MHz.

[5] Three laser test; each laser with a modulation index of 60%;  $P_{\text{opt}} = 1$  mW (total).

[6]  $f_m = 853.25$  MHz;  $f_p = 133.25$  MHz;  $f_q = 265.25$  MHz;  $f_r = 721.25$  MHz.

**Fig 4. Monitor current pin.**

6. 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; 8 gold-plated in-line leads SOT115T

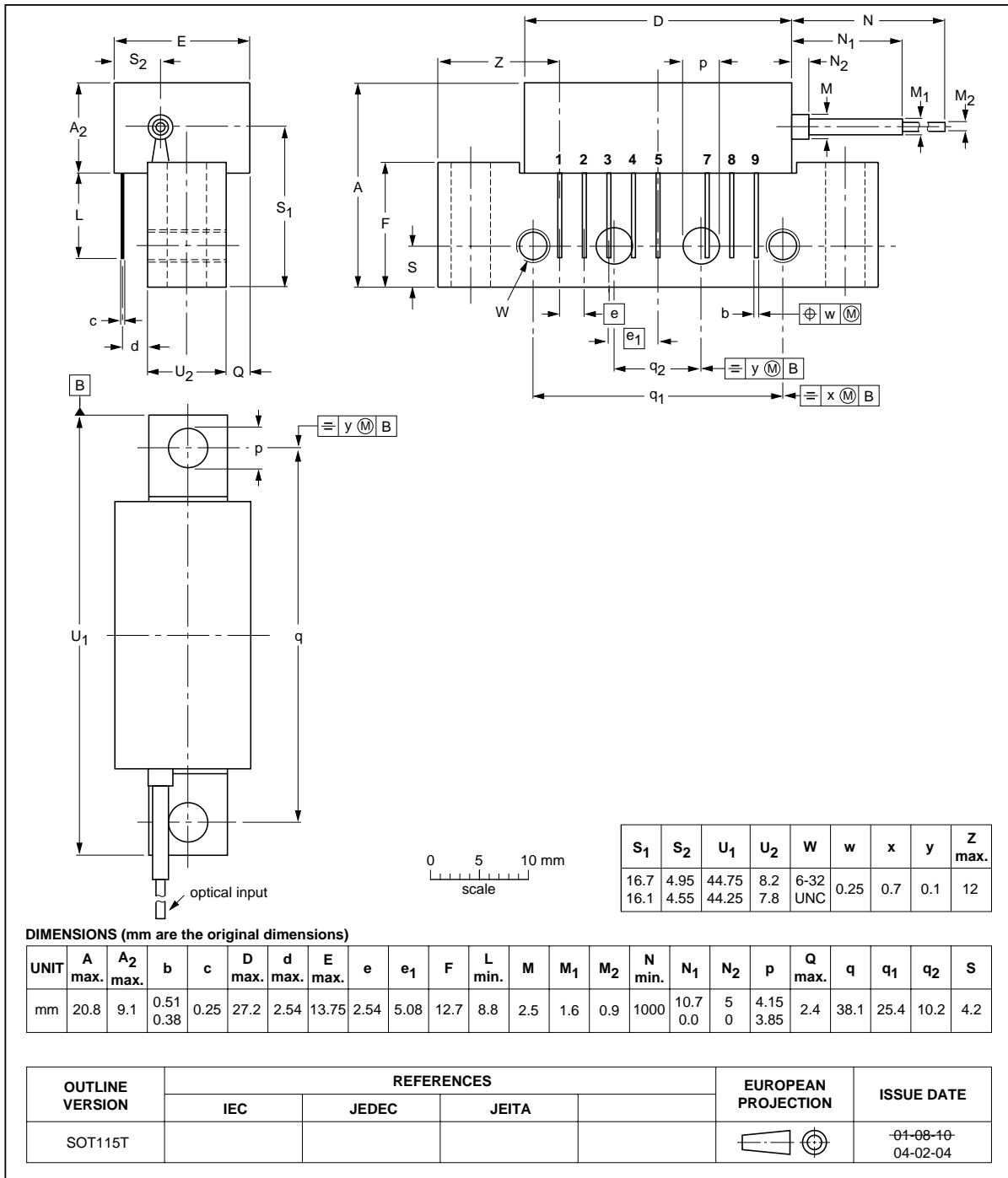


Fig 5. Package outline SOT115T.

Rectangular single-ended package; aluminium flange;  
2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes;  
optical input with connector; 8 gold-plated in-line leads

SOT115X

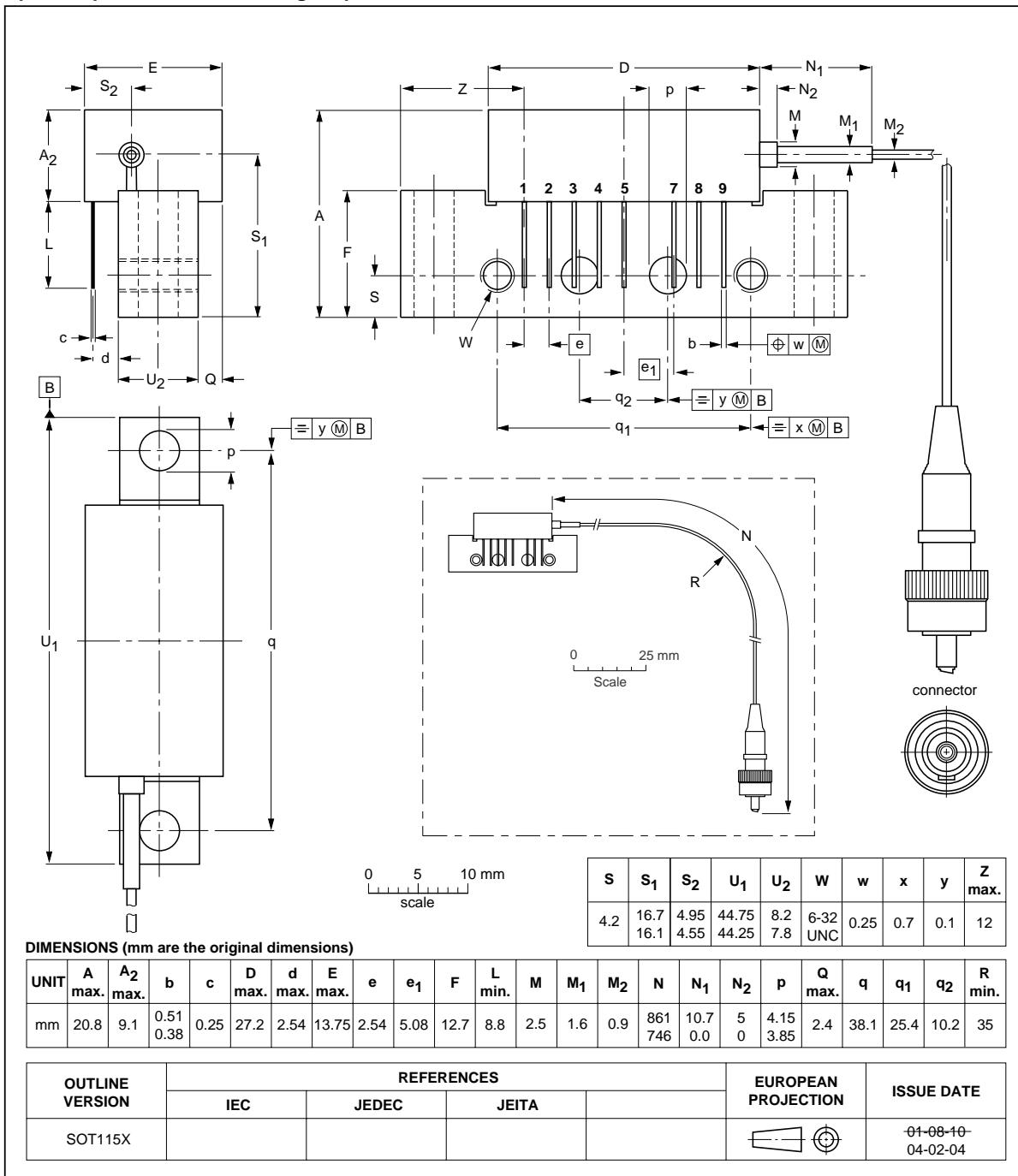


Fig 6. Package outline SOT115X.

Rectangular single-ended package; aluminium flange;  
2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes;  
optical input with connector; 8 gold-plated in-line leads

SOT115Y

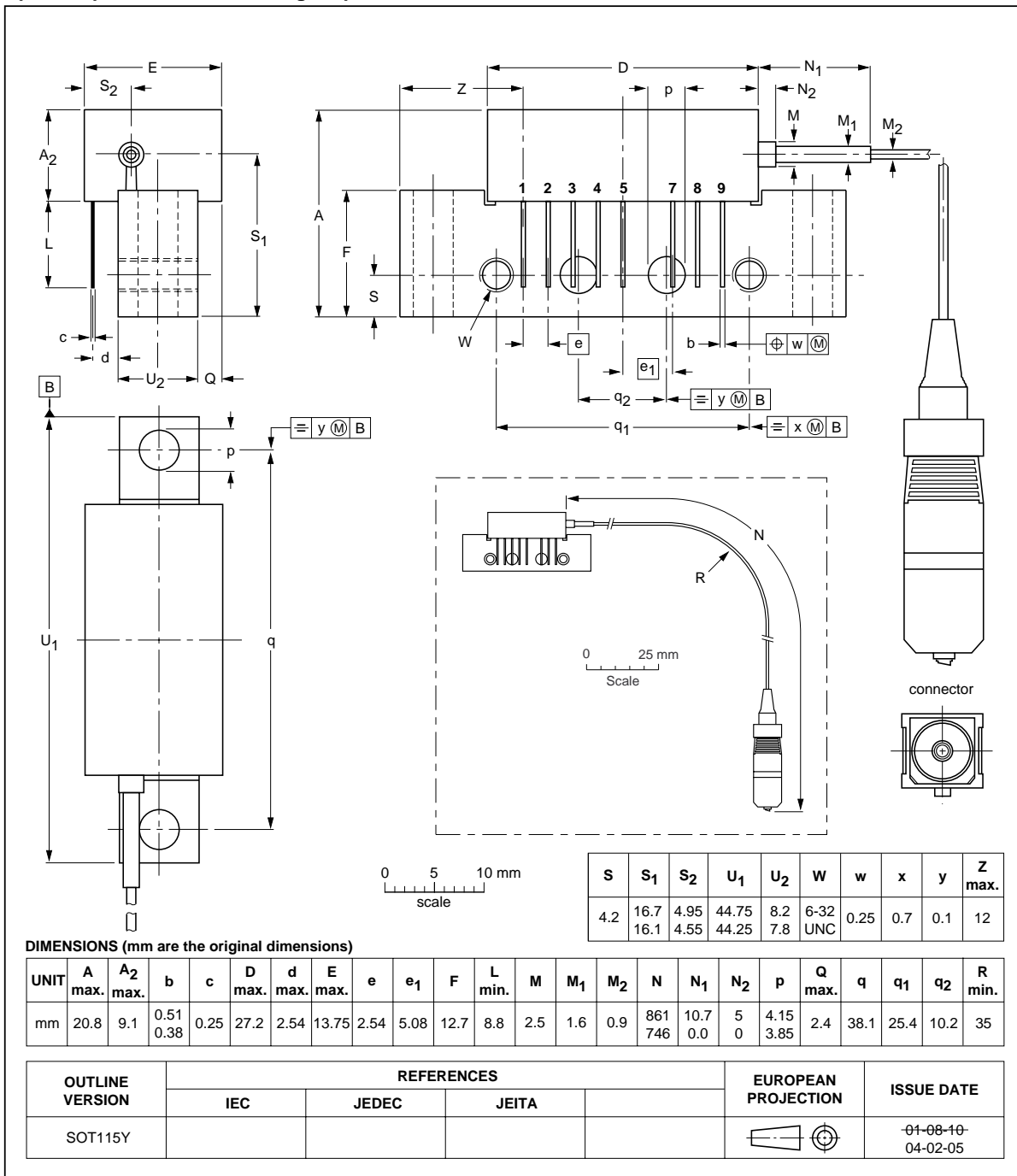


Fig 7. Package outline SOT115Y.

## 7. Handling information

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

## 8. Revision history

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Table 6: Revision history

| Document ID      | Release date | Data sheet status  | Change notice | Order number   | Supersedes |
|------------------|--------------|--------------------|---------------|----------------|------------|
| BGO807_FC0_SC0_1 | 20040707     | Product data sheet | -             | 9397 750 13192 | -          |



## 9. Data sheet status

| Level | Data sheet status [1] | Product status [2] [3] | Definition   |
|-------|-----------------------|------------------------|--|
| I     | 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.  |
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[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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**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.

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