

# BGO807; BGO807/FC0; BGO807/SC0

870 MHz optical receivers

Rev. 2 — 29 September 2010

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 device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

### 1.2 Features and benefits

- 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.



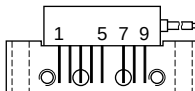
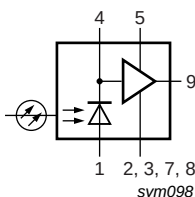
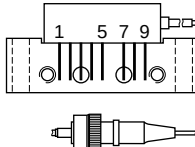
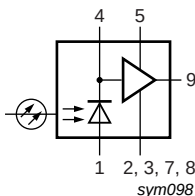
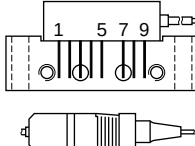
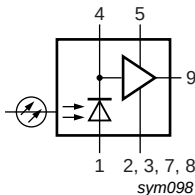
## 1.4 Quick reference data

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                       | Simplified outline                                                                   | Graphic symbol                                                                        |
|----------------------|-----------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| BGO807 (SOT115T)     |                                   |                                                                                      |                                                                                       |
| 1                    | monitor current                   |   |   |
| 2, 3                 | common                            |                                                                                      |                                                                                       |
| 4                    | +V <sub>B</sub> of the photodiode |                                                                                      |                                                                                       |
| 5                    | +V <sub>B</sub> of the amplifier  |                                                                                      |                                                                                       |
| 7, 8                 | common                            |                                                                                      |                                                                                       |
| 9                    | output                            |                                                                                      | <i>sym098</i>                                                                         |
| BGO807/FC0 (SOT115X) |                                   |                                                                                      |                                                                                       |
| 1                    | monitor current                   |  |  |
| 2, 3                 | common                            |                                                                                      |                                                                                       |
| 4                    | +V <sub>B</sub> of the photodiode |                                                                                      |                                                                                       |
| 5                    | +V <sub>B</sub> of the amplifier  |                                                                                      |                                                                                       |
| 7, 8                 | common                            |                                                                                      |                                                                                       |
| 9                    | output                            |                                                                                      | <i>sym098</i>                                                                         |
| BGO807/SC0 (SOT115Y) |                                   |                                                                                      |                                                                                       |
| 1                    | monitor current                   |  |  |
| 2, 3                 | common                            |                                                                                      |                                                                                       |
| 4                    | +V <sub>B</sub> of the photodiode |                                                                                      |                                                                                       |
| 5                    | +V <sub>B</sub> of the amplifier  |                                                                                      |                                                                                       |
| 7, 8                 | common                            |                                                                                      |                                                                                       |
| 9                    | output                            |                                                                                      | <i>sym098</i>                                                                         |

### 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   | dB     |
| 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).

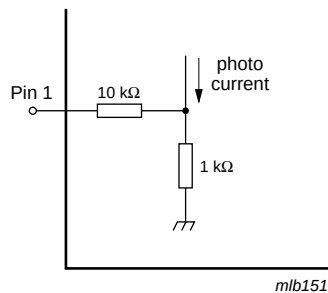
[2]  $f_m = 446.5$  MHz;  $f_p = 97.25$  MHz;  $f_q = 349.25$  MHz.

[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 1. 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

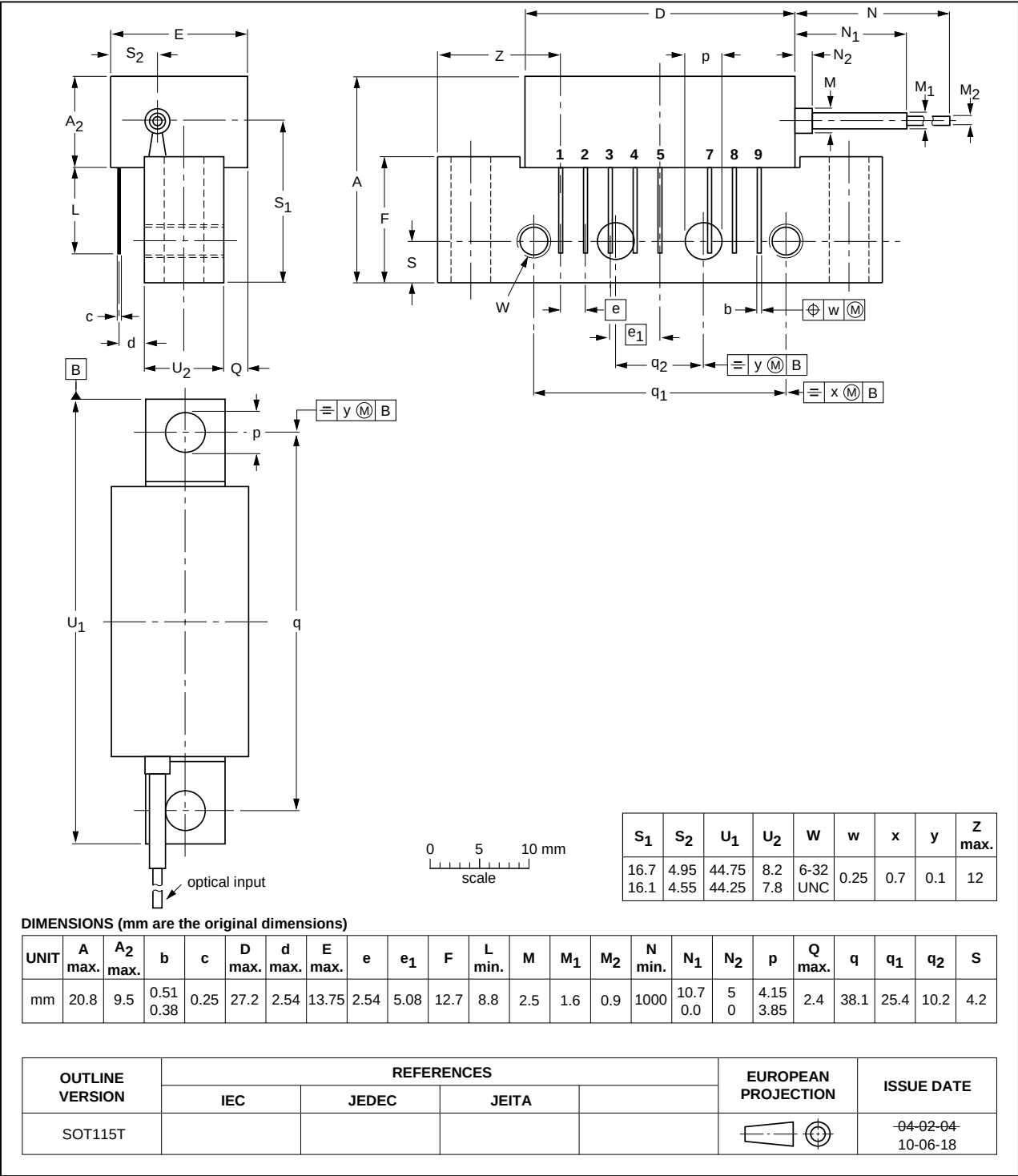


Fig 2. Package outline SOT115T.

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

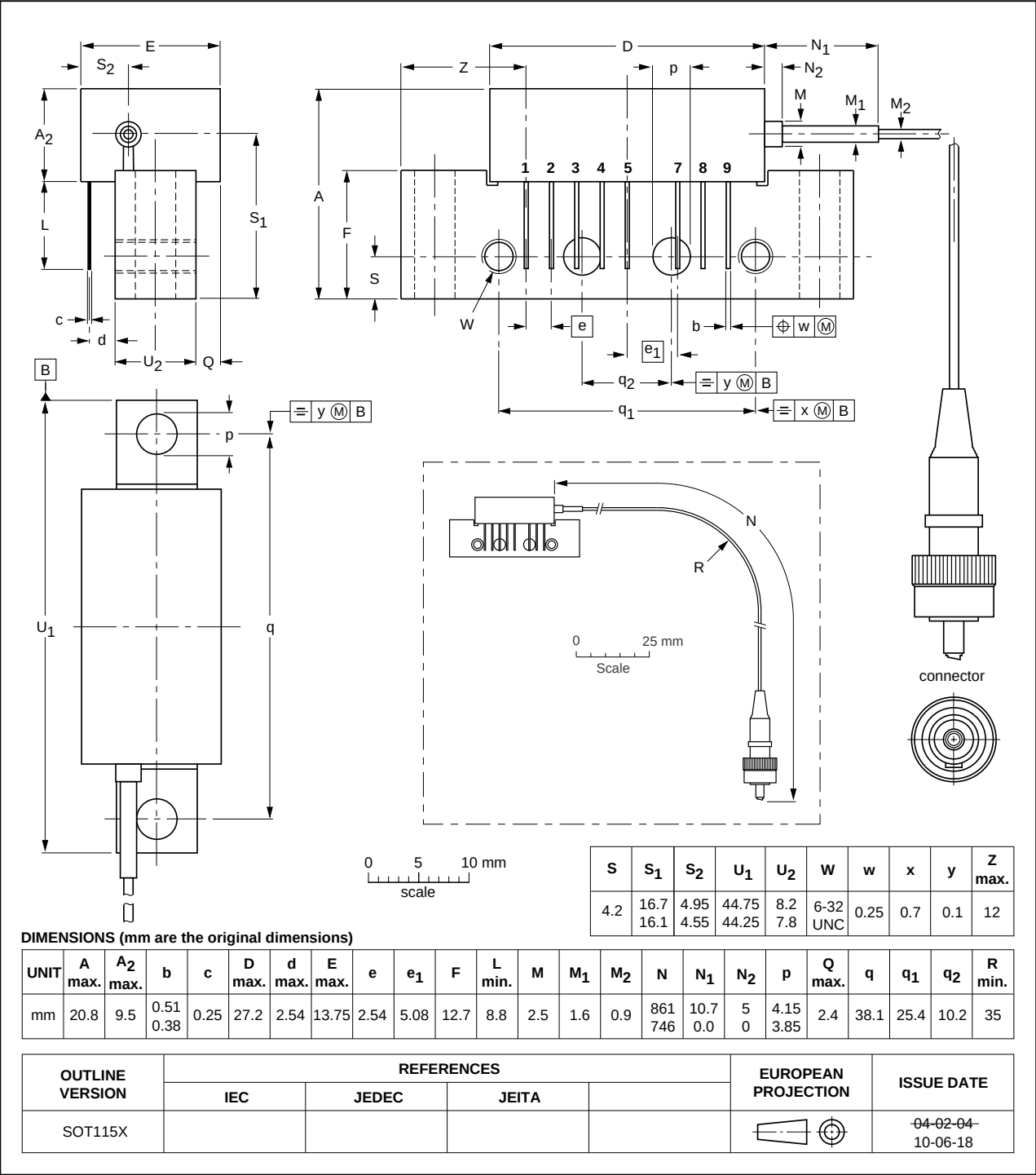
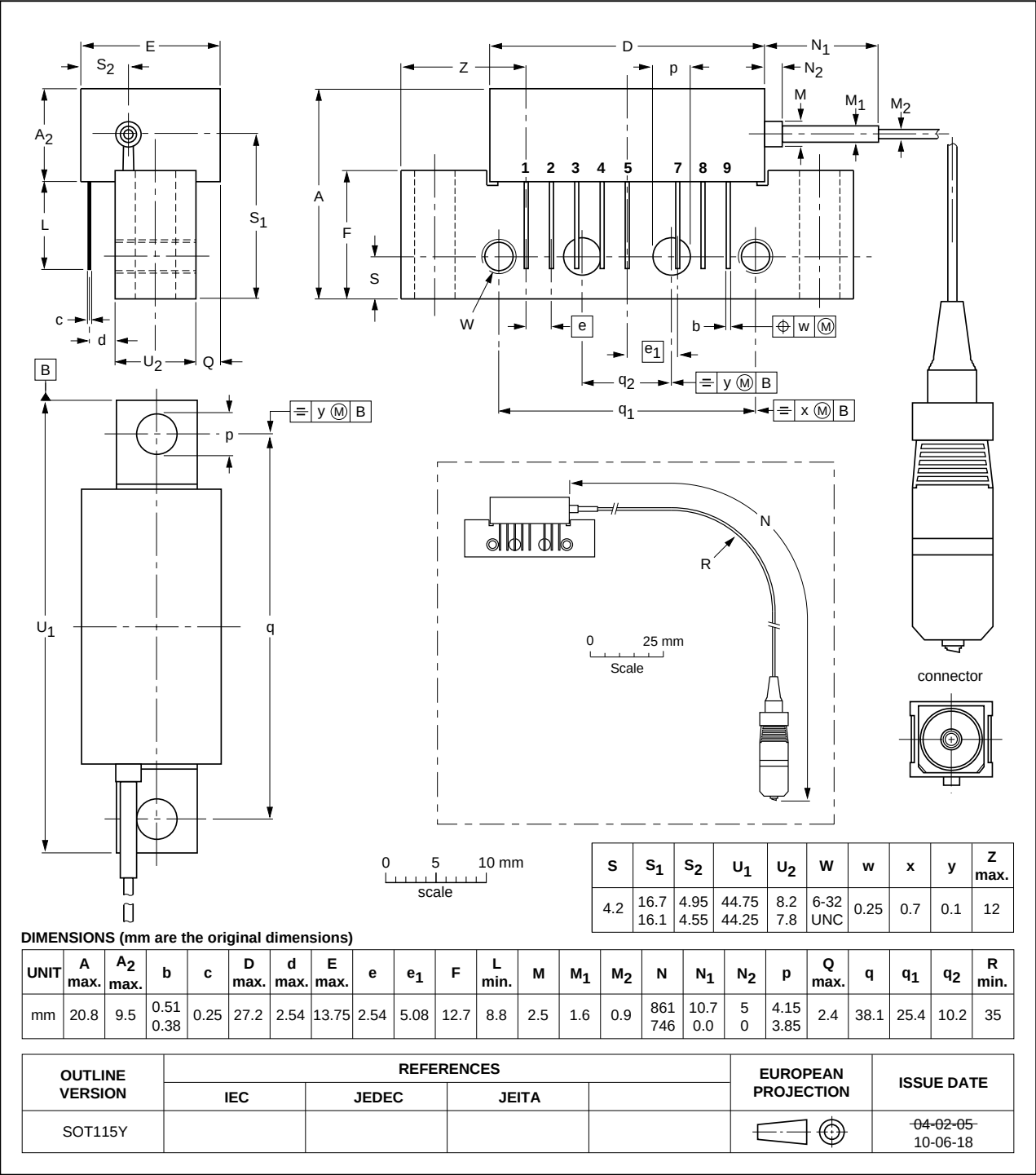


Fig 3. Package outline SOT115X.

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



## 7. Handling information

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

## 8. Revision history

Table 6. Revision history

| Document ID                            | Release date                                                                                                                                                                                                                                                                                                                                                                                                                                      | Data sheet status  | Change notice | Supersedes         |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|--------------------|
| BGO807_FC0_SC0 v.2                     | 20100929                                                                                                                                                                                                                                                                                                                                                                                                                                          | Product data sheet | -             | BGO807_FC0_SC0 v.1 |
| Modifications:                         | <ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• Pinning information: presentation was modified, graphic symbols were added.</li><li>• Package outline and simplified outline drawings have been updated to the latest version.</li></ul> |                    |               |                    |
| BGO807_FC0_SC0 v.1<br>(9397 750 13192) | 20040707                                                                                                                                                                                                                                                                                                                                                                                                                                          | Product data sheet | -             | -                  |



## 9. Legal information

### 9.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | Definition                                                                            |
|-----------------------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Objective [short] data sheet      | Development                   | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet    | Qualification                 | This document contains data from the preliminary specification.                       |
| Product [short] data sheet        | Production                    | This document contains the product specification.                                     |

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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