

# BGO827; BGO827/FC0; BGO827/SC0

## 870 MHz optical receivers

Rev. 5 — 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 photodiode 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 photodiode current and an electrical output having a characteristic impedance of 75 Ω.

**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.

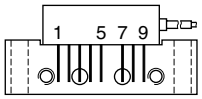
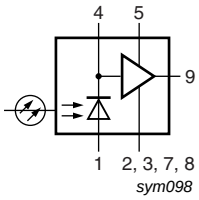
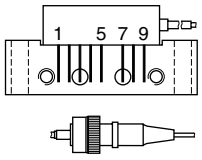
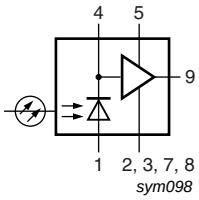
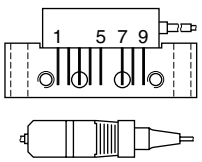
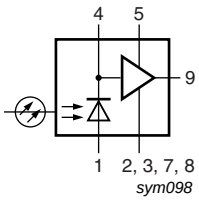
### 1.4 Quick reference data

**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| f | frequency range | | 40 | - | 870 | MHz |
| $s_{22}$ | output return losses | f = 40 MHz to 870 MHz | 11 | - | - | dB |
| | optical input return losses | | 45 | - | - | dB |
| $d_2$ | second order distortion | f = 854.5 MHz | - | - | –57 | dB |
| F | equivalent noise input | f = 40 MHz to 870 MHz | - | - | 8.5 | pA/√Hz |
| $I_{tot}$ | total current consumption (DC) | $V_B$ = 24 V | 175 | - | 205 | mA |

## 2. Pinning information

**Table 2. Pinning**

| Pin | Description | Simplified outline | Graphic symbol |
|---|---|---|---|
| **BGO827 (SOT115T)** | | | |
| 1 | monitor current |  |  |
| 2, 3 | common | | |
| 4 | +$V_B$ of the photodiode | | |
| 5 | +$V_B$ of the amplifier | | |
| 7, 8 | common | | |
| 9 | output | | |
| **BGO827/FC0 (SOT115X)** | | | |
| 1 | monitor current |  |  |
| 2, 3 | common | | |
| 4 | +$V_B$ of the photodiode | | |
| 5 | +$V_B$ of the amplifier | | |
| 7, 8 | common | | |
| 9 | output | | |
| **BGO827/SC0 (SOT115Y)** | | | |
| 1 | monitor current |  |  |
| 2, 3 | common | | |
| 4 | +$V_B$ of the photodiode | | |
| 5 | +$V_B$ of the amplifier | | |
| 7, 8 | common | | |
| 9 | output | | |


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## 3. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BGO827 | - | 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 |
| BGO827/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 |
| BGO827/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 |
| $T_{stg}$ | storage temperature | | –40 | +85 | °C |
| $T_{mb}$ | 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 |

## 5. Characteristics

**Table 5. Characteristics**

*Bandwidth 40 MHz to 870 MHz; $V_B$ = 24 V; $T_{mb}$ = 30 °C; $Z_L$ = 75 Ω.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| S | responsivity | | | | | |
| | BGO827 | λ = 1300 nm | 800 | - | - | V/W |
| | BGO827/FC0; BGO827/SC0 | | 750 | - | - | V/W |
| ΔS | responsivity difference | responsivity at $T_{mb}$ = 85 °C – responsivity at $T_{mb}$ = 30 °C; f = 870 MHz | - | –50 | - | 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 |
| ΔSL | slope difference | slope at $T_{mb}$ = 85 °C – slope at $T_{mb}$ = 30 °C | - | –0.35 | - | dB |
| $s_{22}$ | output return losses | f = 40 MHz to 870 MHz | 11 | - | - | dB |
| | optical input return losses | | 45 | - | - | dB |


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

*Bandwidth 40 MHz to 870 MHz; $V_B$ = 24 V; $T_{mb}$ = 30 °C; $Z_L$ = 75 Ω.*

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $d_2$ | second order distortion | $f_m$ = 446.5 MHz | [1][2] | - | - | −68 | dB |
| | | $f_m$ = 746.5 MHz | [1][3] | - | - | −63 | dB |
| | | $f_m$ = 854.5 MHz | [1][4] | - | - | −57 | dB |
| Δd2 | second order distortion difference | $d_2$ at $T_{mb}$ = 85 °C − $d_2$ at $T_{mb}$ = 30 °C | | - | 2.5 | - | dB |
| | | $d_2$ at $T_{mb}$ = −20 °C − $d_2$ at $T_{mb}$ = 30 °C | | - | −1.5 | - | dB |
| $d_3$ | third order distortion | $f_m$ = 853.25 MHz | [5][6] | - | - | −73 | dB |
| Δd3 | third order distortion difference | $d_3$ at $T_{mb}$ = 85 °C − $d_3$ at $T_{mb}$ = 30 °C | | - | 1 | - | dB |
| | | $d_3$ at $T_{mb}$ = −20 °C − $d_3$ at $T_{mb}$ = 30 °C | | - | −1 | - | dB |
| F | equivalent noise input | f = 40 MHz to 450 MHz | | - | - | 7 | pA/√Hz |
| | | f = 450 MHz to 750 MHz | | - | - | 8 | pA/√Hz |
| | | f = 750 MHz to 870 MHz | | - | - | 8.5 | 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 fiber | SM type; 9/125 μm | | | | | |
| | BGO827 | | | 1 | - | - | m |
| | BGO827/FC0; BGO827/SC0 | | | 746 | - | 861 | mm |
| $I_{tot}$ | total current consumption (DC) | | | 175 | - | 205 | mA |
| $I_{bias}$ | diode bias current at pin 4 (DC) | | | - | - | 25 | mA |

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

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

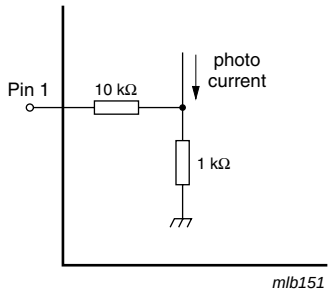


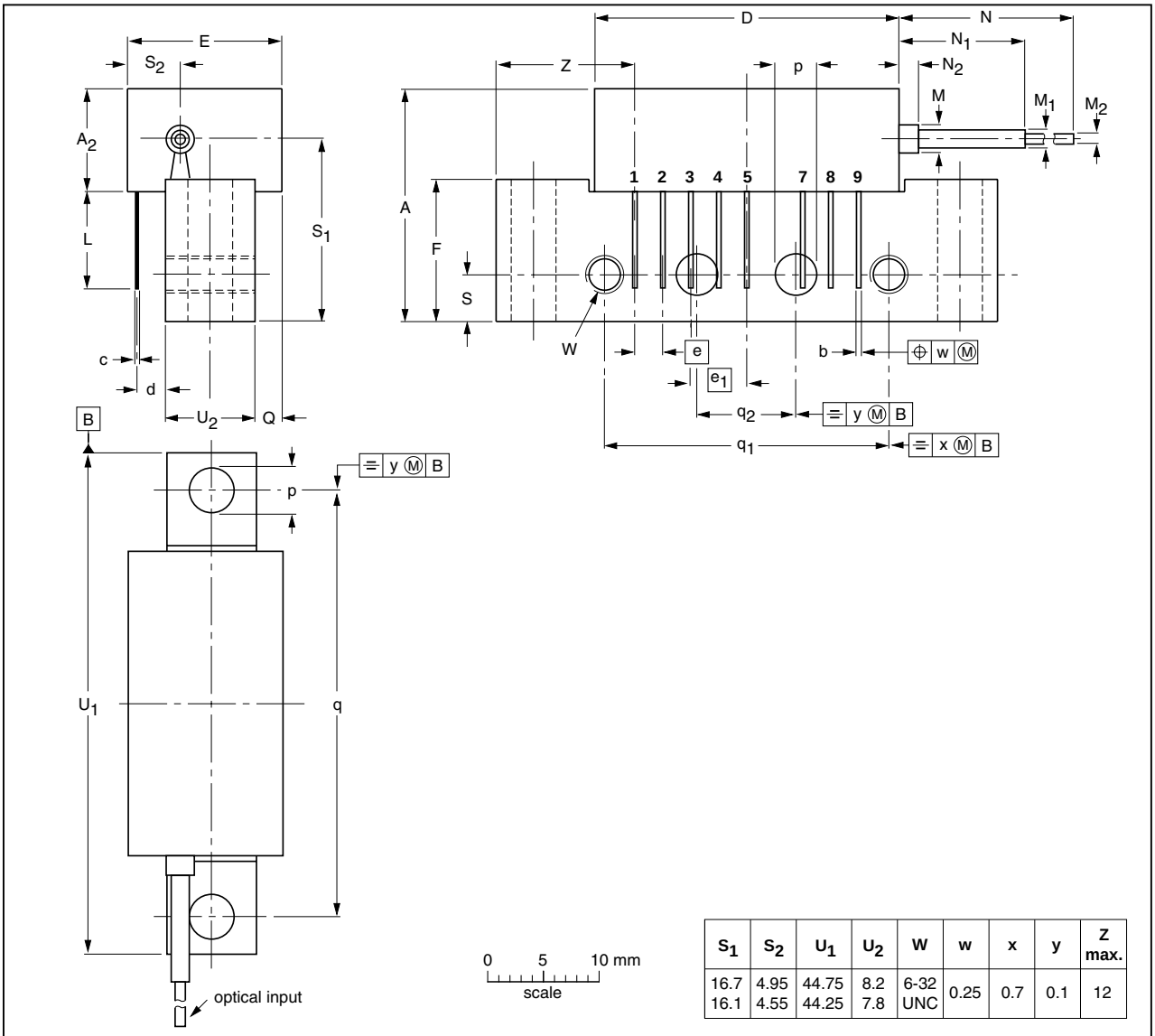

**Fig 1. Monitor current pin**


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## 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**




| $S_1$ | $S_2$ | $U_1$ | $U_2$ | W | w | x | y | Z max. |
|---|---|---|---|---|---|---|---|---|
| 16.7<br>16.1 | 4.95<br>4.55 | 44.75<br>44.25 | 8.2<br>7.8 | 6-32 UNC | 0.25 | 0.7 | 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. | $N_1$ | $N_2$ | p | Q max. | q | $q_1$ | $q_2$ | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 20.8 | 9.5 | 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<br>0.0 | 5<br>0 | 4.15<br>3.85 | 2.4 | 38.1 | 25.4 | 10.2 | 4.2 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT115T | | | | | | ~~04-02-04~~<br>10-06-18 |

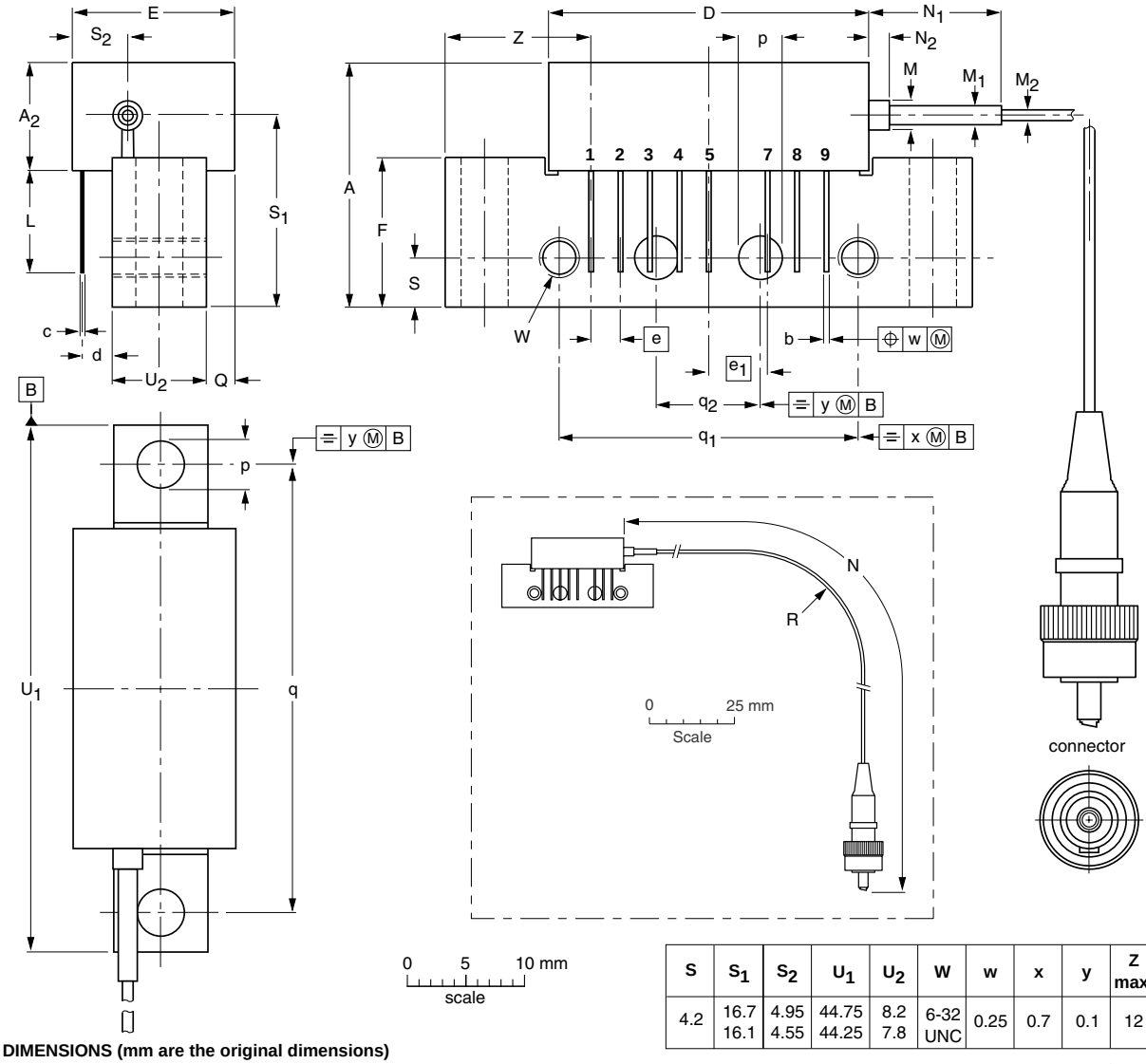
**Fig 2. Package outline SOT115T**


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**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**




| S | $S_1$ | $S_2$ | $U_1$ | $U_2$ | W | w | x | y | Z max. |
|---|---|---|---|---|---|---|---|---|---|
| 4.2 | 16.7<br>16.1 | 4.95<br>4.55 | 44.75<br>44.25 | 8.2<br>7.8 | 6-32 UNC | 0.25 | 0.7 | 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 | $N_1$ | $N_2$ | p | Q max. | q | $q_1$ | $q_2$ | R min. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 20.8 | 9.5 | 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 | 861<br>746 | 10.7<br>0.0 | 5<br>0 | 4.15<br>3.85 | 2.4 | 38.1 | 25.4 | 10.2 | 35 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT115X | | | | | | ~~04-02-04~~<br>10-06-18 |

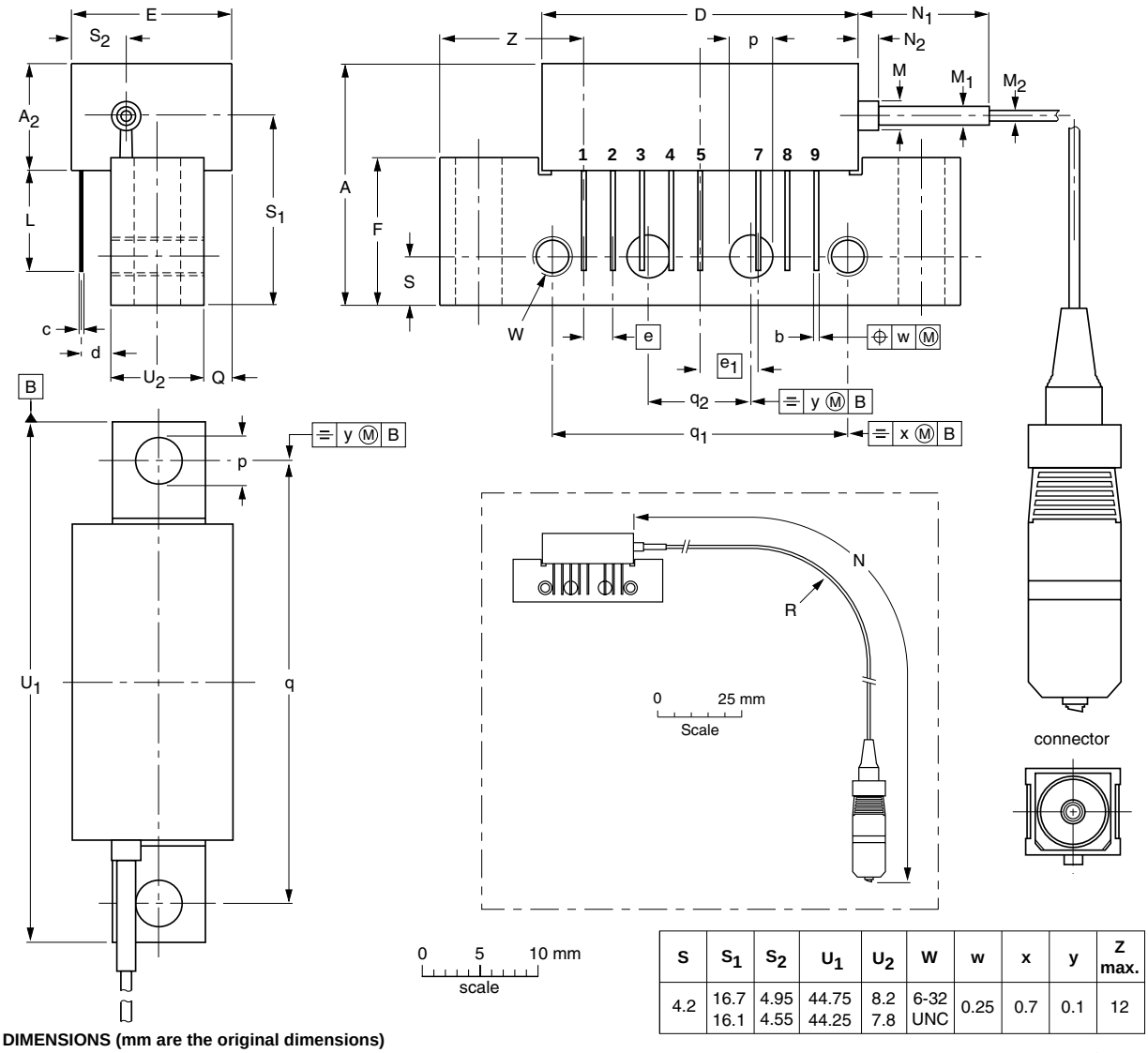
**Fig 3. Package outline SOT115X**


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**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**




| S | $S_1$ | $S_2$ | $U_1$ | $U_2$ | W | w | x | y | Z max. |
|---|---|---|---|---|---|---|---|---|---|
| 4.2 | 16.7<br>16.1 | 4.95<br>4.55 | 44.75<br>44.25 | 8.2<br>7.8 | 6-32 UNC | 0.25 | 0.7 | 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 | $N_1$ | $N_2$ | p | Q max. | q | $q_1$ | $q_2$ | R min. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 20.8 | 9.5 | 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 | 861<br>746 | 10.7<br>0.0 | 5<br>0 | 4.15<br>3.85 | 2.4 | 38.1 | 25.4 | 10.2 | 35 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT115Y | | | | | | ~~04-02-05~~<br>10-06-18 |

**Fig 4. Package outline SOT115Y**


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## 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 |
|---|---|---|---|---|
| BGO827_FC0_SC0 v.5 | 20100929 | Product data sheet | - | BGO827_FC0_SC0 v.4 |
| Modifications: | • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.<br>• Legal texts have been adapted to the new company name where appropriate.<br>• Package outline and simplified outline drawings have been updated to the latest version. | | | |
| BGO827_FC0_SC0 v.4 (9397 750 14436) | 20050329 | Product data sheet | - | BGO827_FC0_SC0 v.3 |
| BGO827_FC0_SC0 v.3 (9397 750 13061) | 20040407 | Product specification | - | BGO827_FC0_SC0 v.2 |
| BGO827_FC0_SC0 v.2 (9397 750 10522) | 20021210 | Product specification | - | BGO827_FC0_SC0 v.1 |
| BGO827_FC0_SC0 v.1 (9397 750 09934) | 20020627 | Product specification | - | - |


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| Document status[1][2] | Product status[3] | Definition |
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| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
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[2] The term 'short data sheet' is explained in section "Definitions".

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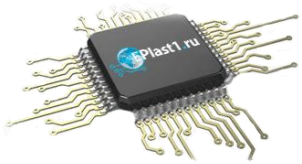
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.




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