



# 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  $\Omega$ .

#### 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.



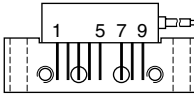
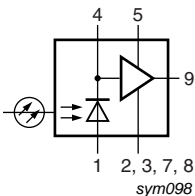
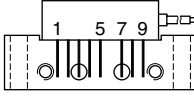
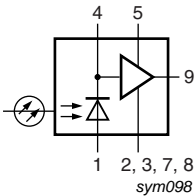
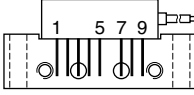
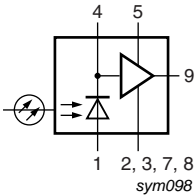
## 1.4 Quick reference data

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	-	-	-57	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
<b>BGO827 (SOT115T)</b>			
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		
<b>BGO827/FC0 (SOT115X)</b>			
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		
<b>BGO827/SC0 (SOT115Y)</b>			
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		

### 3. Ordering information

**Table 3. Ordering information**

Type number	Package		Version
	Name	Description	
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 <sub>stg</sub>	storage temperature		-40	+85	°C
T <sub>mb</sub>	mounting base temperature		-20	+85	°C
P <sub>in</sub>	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<sub>B</sub> = 24 V; T<sub>mb</sub> = 30 °C; Z<sub>L</sub> = 75 Ω.

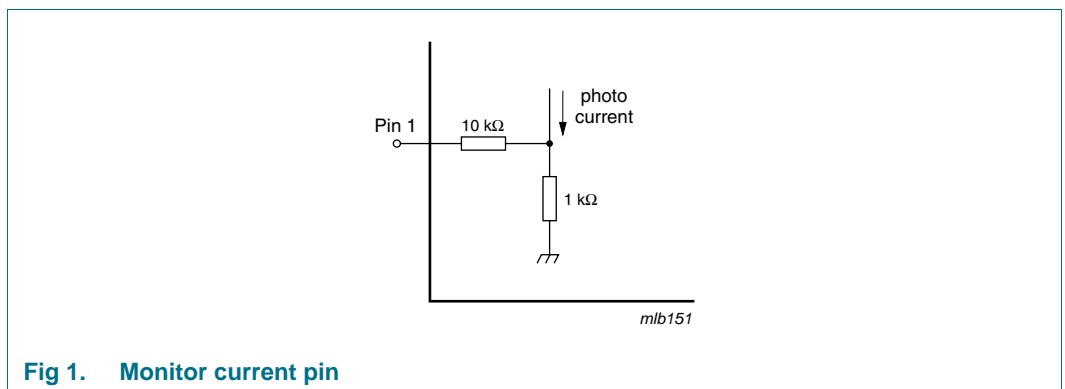
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
S	responsivity						
		BGO827	λ = 1300 nm	800	-	-	V/W
		BGO827/FC0; BGO827/SC0		750	-	-	V/W
ΔS	responsivity difference	responsivity at T <sub>mb</sub> = 85 °C – responsivity at T <sub>mb</sub> = 30 °C; f = 870 MHz	-	-50	-	V/W	
FL	flatness straight line (peak 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 <sub>mb</sub> = 85 °C – slope at T <sub>mb</sub> = 30 °C	-	-0.35	-	dB	
S <sub>22</sub>	output return losses	f = 40 MHz to 870 MHz	11	-	-	dB	
	optical input return losses		45	-	-	dB	

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

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$d_2$	second order distortion	$f_m = 446.5\text{ MHz}$	[1][2]	-	-	-68	dB
		$f_m = 746.5\text{ MHz}$	[1][3]	-	-	-63	dB
		$f_m = 854.5\text{ MHz}$	[1][4]	-	-	-57	dB
$\Delta d_2$	second order distortion difference	$d_2$ at $T_{mb} = 85\text{ °C}$ - $d_2$ at $T_{mb} = 30\text{ °C}$	-	2.5	-	dB	
		$d_2$ at $T_{mb} = -20\text{ °C}$ - $d_2$ at $T_{mb} = 30\text{ °C}$	-	-1.5	-	dB	
$d_3$	third order distortion	$f_m = 853.25\text{ MHz}$	[5][6]	-	-	-73	dB
$\Delta d_3$	third order distortion difference	$d_3$ at $T_{mb} = 85\text{ °C}$ - $d_3$ at $T_{mb} = 30\text{ °C}$	-	1	-	dB	
		$d_3$ at $T_{mb} = -20\text{ °C}$ - $d_3$ at $T_{mb} = 30\text{ °C}$	-	-1	-	dB	
F	equivalent noise input	$f = 40\text{ MHz to }450\text{ MHz}$	-	-	7	$\text{pA}/\sqrt{\text{Hz}}$	
		$f = 450\text{ MHz to }750\text{ MHz}$	-	-	8	$\text{pA}/\sqrt{\text{Hz}}$	
		$f = 750\text{ MHz to }870\text{ MHz}$	-	-	8.5	$\text{pA}/\sqrt{\text{Hz}}$	
$s_\lambda$	spectral sensitivity	$\lambda = 1310 \pm 20\text{ nm}$	0.85	-	-	A/W	
		$\lambda = 1550 \pm 20\text{ nm}$	0.9	-	-	A/W	
$\lambda$	optical wavelength		1290	-	1600	nm	
L	length of optical fiber	SM type; 9/125 $\mu\text{m}$					
		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 %;  $P_{opt} = 1\text{ mW}$  (total)
- [2]  $f_m = 446.5\text{ MHz}$ ;  $f_p = 97.25\text{ MHz}$ ;  $f_q = 349.25\text{ MHz}$
- [3]  $f_m = 746.5\text{ MHz}$ ;  $f_p = 133.25\text{ MHz}$ ;  $f_q = 613.25\text{ MHz}$
- [4]  $f_m = 854.5\text{ MHz}$ ;  $f_p = 133.25\text{ MHz}$ ;  $f_q = 721.25\text{ MHz}$
- [5] Three laser test; each laser with a modulation index of 60 %;  $P_{opt} = 1\text{ mW}$  (total)
- [6]  $f_m = 853.25\text{ MHz}$ ;  $f_p = 133.25\text{ MHz}$ ;  $f_q = 265.25\text{ MHz}$ ;  $f_r = 721.25\text{ MHz}$

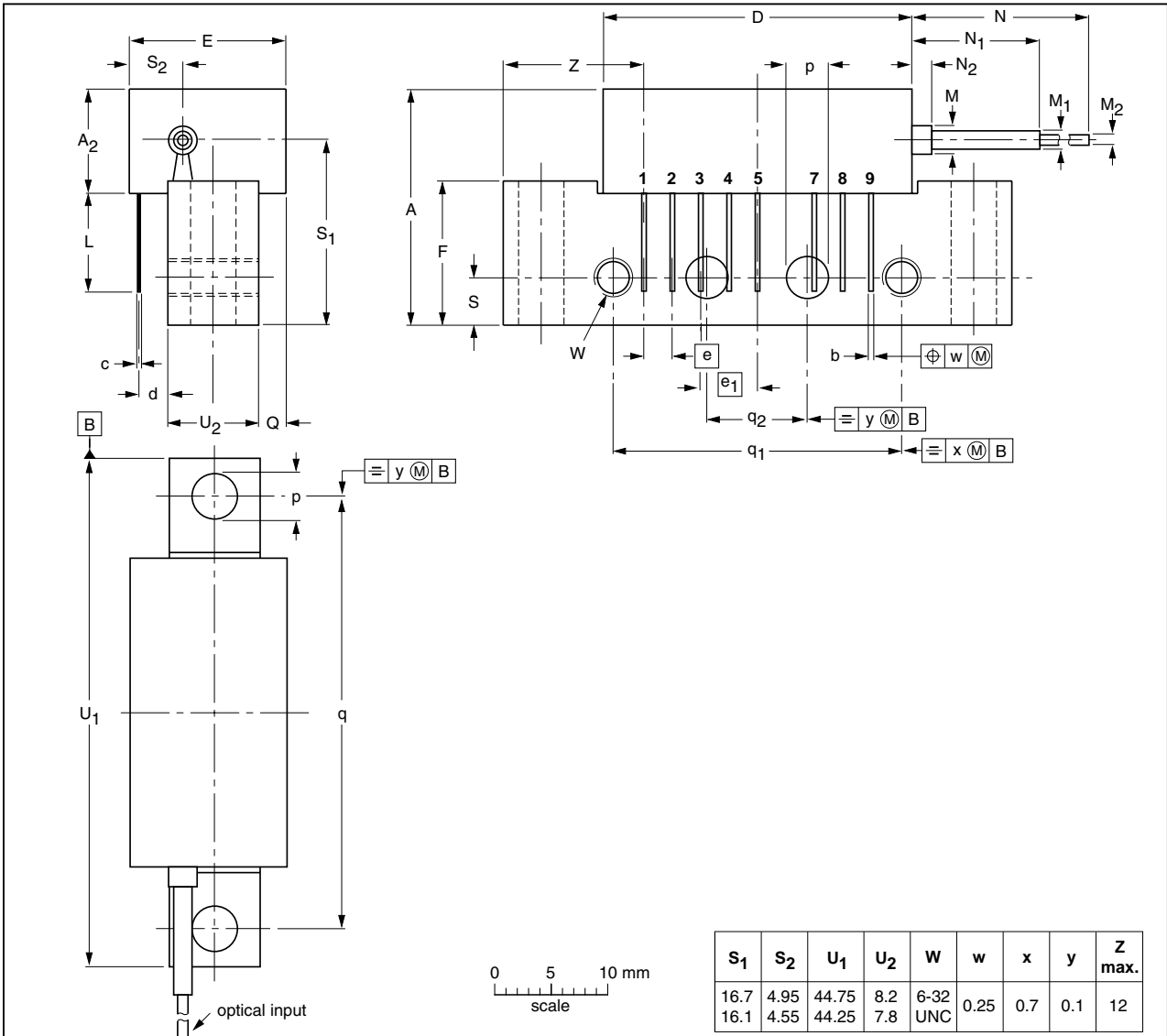


**Fig 1. Monitor current pin**

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



S <sub>1</sub>	S <sub>2</sub>	U <sub>1</sub>	U <sub>2</sub>	W	w	x	y	Z max.
16.7	4.95	44.75	8.2	6-32	0.25	0.7	0.1	12
16.1	4.55	44.25	7.8	UNC				

DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A <sub>2</sub> max.	b	c	D max.	d max.	E max.	e	e <sub>1</sub>	F	L min.	M	M <sub>1</sub>	M <sub>2</sub>	N min.	N <sub>1</sub>	N <sub>2</sub>	p	Q max.	q	q <sub>1</sub>	q <sub>2</sub>	S
mm	20.8	9.5	0.51 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 0.0	5 0	4.15 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 10-06-18

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

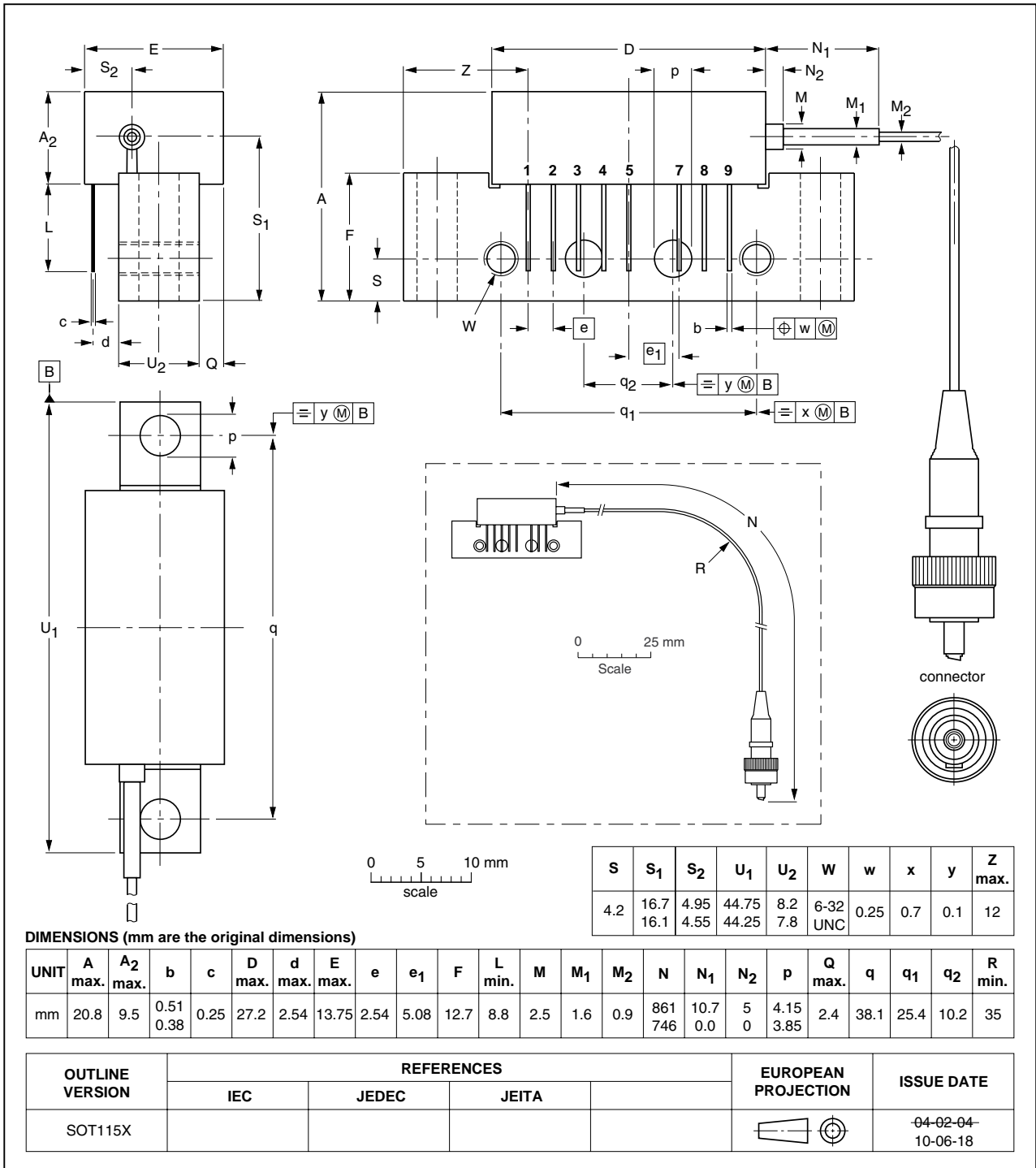


Fig 3. Package outline SOT115X

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

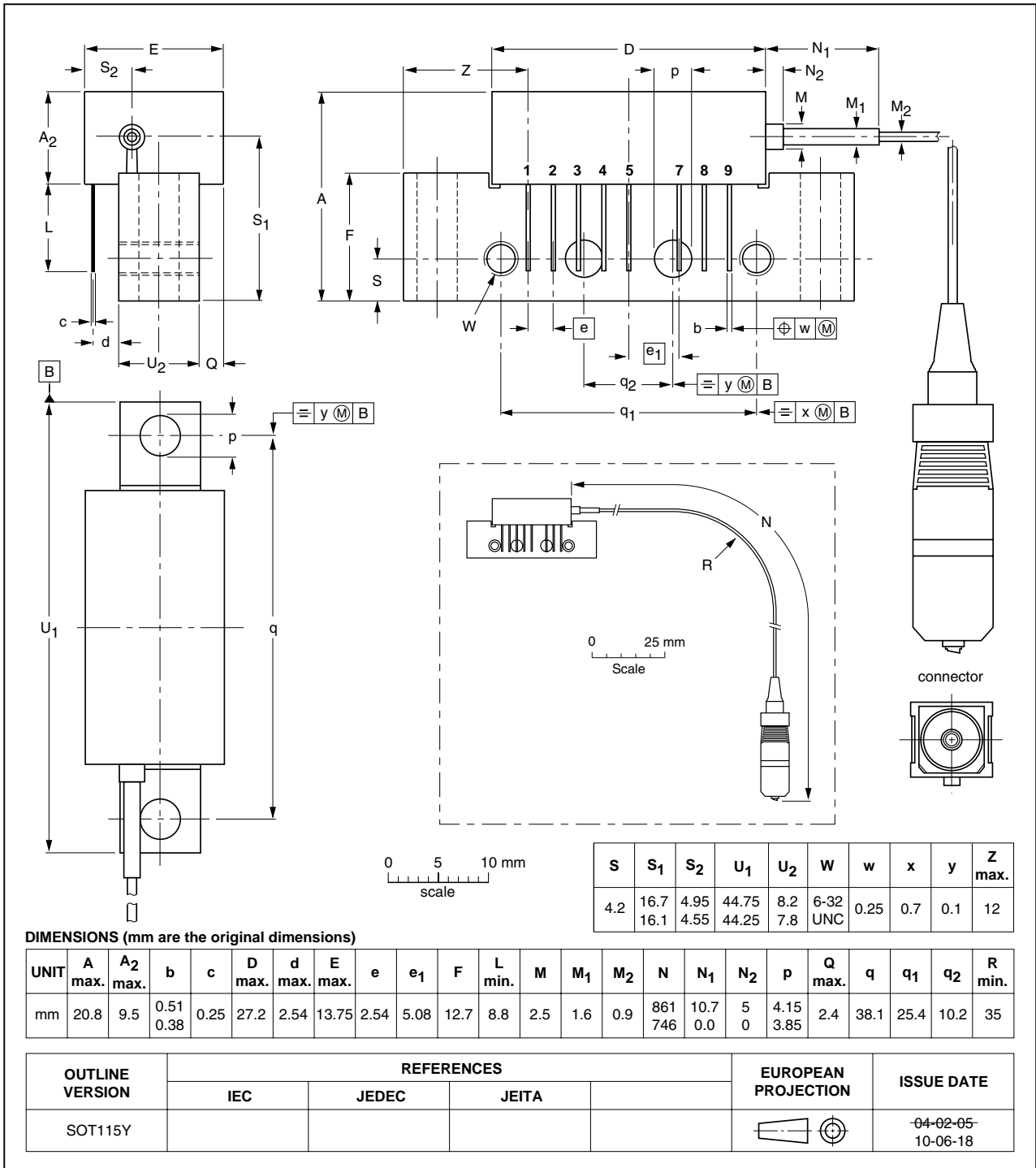


Fig 4. Package outline SOT115Y

## 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
BGO827_FC0_SC0 v.5	20100929	Product data sheet	-	BGO827_FC0_SC0 v.4
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>• Package outline and simplified outline drawings have been updated to the latest version.</li> </ul>			
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	-	-



## 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".

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Date of release: 29 September 2010

Document identifier: BGO827\_FC0\_SC0