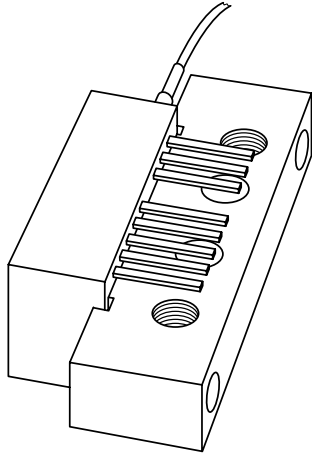


# DATA SHEET



## **BGO847; BGO847/FC0; BGO847/SC0** Optical receiver modules

Product specification  
Supersedes data of 2000 Jan 04

2000 Apr 12

# Optical receiver modules

## BGO847; BGO847/FC0; BGO847/SC0

### FEATURES

- Improved BGE847BO
- Excellent linearity
- Extremely low noise up to 870 MHz
- Excellent flatness (straight line)
- Standard CATV outline
- Rugged construction
- Gold metallization ensures excellent reliability
- High optical input power range.

### APPLICATIONS

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

### DESCRIPTION

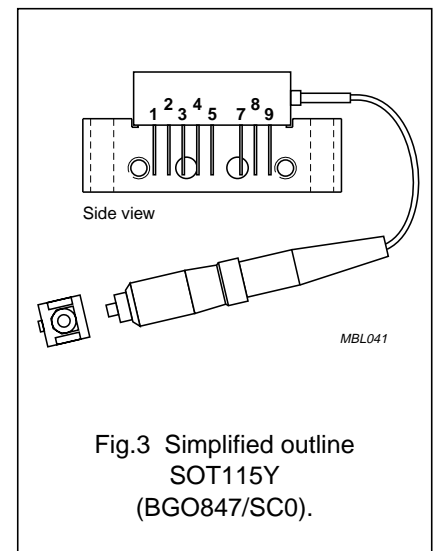
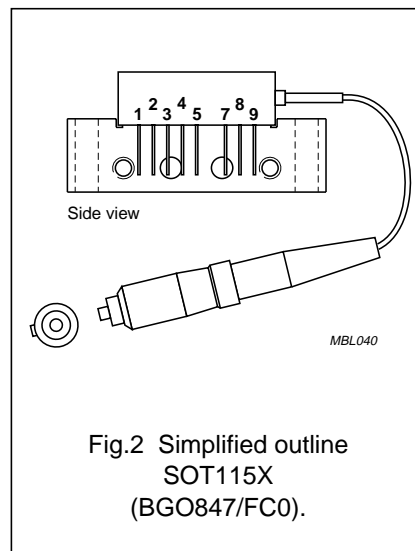
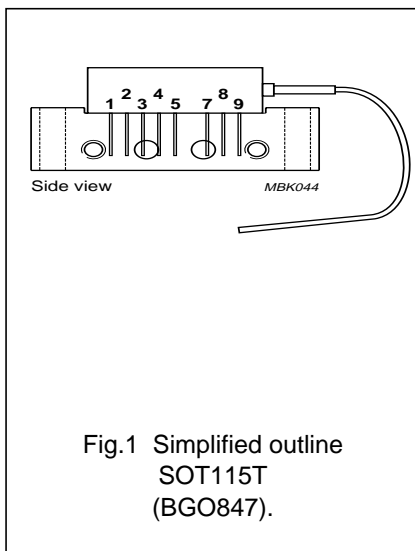
High dynamic range optical receiver amplifier modules in a standard SOT115 package where the non-jacketed fibre has either no connector or an FC/APC or an SC/APC connector.

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

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

### 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



### QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
f	frequency range		40	870	MHz
S <sub>22</sub>	output return losses	f = 40 to 870 MHz	11	–	dB
	optical input return losses		45	–	dB
d <sub>2</sub>	second order distortion	f = 854.5 MHz	–	–63	dBc
F	equivalent noise input	f = 40 to 750 MHz	–	7	pA/√Hz
I <sub>tot</sub>	total current consumption (DC)	V <sub>B</sub> = 24 V	175	205	mA

### HANDLING

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

## Optical receiver modules

BGO847; BGO847/FC0;  
BGO847/SC0**LIMITING VALUES**

In accordance with the Absolute Maximum Rating System (IEC 134).

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; R = 1.5 kΩ; C = 100 pF	500	-	V

**CHARACTERISTICS**Bandwidth 40 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.	MAX.	UNIT
S	responsivity				
	BGO847	λ = 1300 nm	800	-	V/W
	BGO847/FC0, BGO847/SC0	λ = 1300 nm	750	-	V/W
FL	flatness straight line	peak to valley; f = 40 to 870 MHz	-	1	dB
SL	slope straight line	f = 40 to 870 MHz	0	2	dB
S <sub>22</sub>	output return losses	f = 40 to 870 MHz	11	-	dB
	optical input return losses		45	-	dB
d <sub>2</sub>	second order distortion	f <sub>m</sub> = 54 MHz; notes 1 and 3	-	-73	dB
		f <sub>m</sub> = 446.5 MHz; notes 1 and 4	-	-68	dB
		f <sub>m</sub> = 548.5 MHz; notes 1 and 5	-	-67	dB
		f <sub>m</sub> = 746.5 MHz; notes 1 and 6	-	-63	dB
		f <sub>m</sub> = 854.5 MHz; notes 1 and 7	-	-63	dB
d <sub>3</sub>	third order distortion	f <sub>m</sub> = 55.25 MHz; notes 2 and 8	-	-80	dB
		f <sub>m</sub> = 445.25 MHz; notes 2 and 9	-	-75	dB
		f <sub>m</sub> = 547.25 MHz; notes 2 and 10	-	-75	dB
		f <sub>m</sub> = 745.25 MHz; notes 2 and 11	-	-75	dB
		f <sub>m</sub> = 853.25 MHz; notes 2 and 12	-	-73	dB
F	equivalent input noise	f = 40 to 750 MHz	-	7	pA/√Hz
		f = 750 to 870 MHz	-	8	pA/√Hz
s <sub>λ</sub>	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				
		BGO847	fibre; SM type; 9/125 μm	1	-
	BGO847/FC0, BGO847/SC0	fibre; SM type; 9/125 μm	746	861	mm
I <sub>tot</sub>	total current consumption (DC)		175	205	mA
I <sub>pin 4</sub>	pin diode bias current (DC)		-	25	mA

## Optical receiver modules

BGO847; BGO847/FC0;  
BGO847/SC0**Notes**

1. Two laser test; each laser with 40% modulation index;  $P_{opt} = 1$  mW (total).
2. Three laser test; each laser with 60% modulation index;  $P_{opt} = 1$  mW (total).
3.  $f_m = 54$  MHz;  $f_p = 187.25$  MHz;  $f_q = 133.25$  MHz.
4.  $f_m = 446.5$  MHz;  $f_p = 97.25$  MHz;  $f_q = 349.25$  MHz.
5.  $f_m = 548.5$  MHz;  $f_p = 109.25$  MHz;  $f_q = 439.25$  MHz.
6.  $f_m = 746.5$  MHz;  $f_p = 133.25$  MHz;  $f_q = 613.25$  MHz.
7.  $f_m = 854.5$  MHz;  $f_p = 133.25$  MHz;  $f_q = 721.25$  MHz.
8.  $f_m = 55.25$  MHz;  $f_p = 109.25$  MHz;  $f_q = 133.25$  MHz  $f_r = 187.25$  MHz.
9.  $f_m = 445.25$  MHz;  $f_p = 193.25$  MHz;  $f_q = 349.25$  MHz  $f_r = 97.25$  MHz.
10.  $f_m = 547.25$  MHz;  $f_p = 217.25$  MHz;  $f_q = 439.25$  MHz  $f_r = 109.25$  MHz.
11.  $f_m = 745.25$  MHz;  $f_p = 133.25$  MHz;  $f_q = 265.25$  MHz  $f_r = 613.25$  MHz.
12.  $f_m = 853.25$  MHz;  $f_p = 133.25$  MHz;  $f_q = 265.25$  MHz  $f_r = 721.25$  MHz.

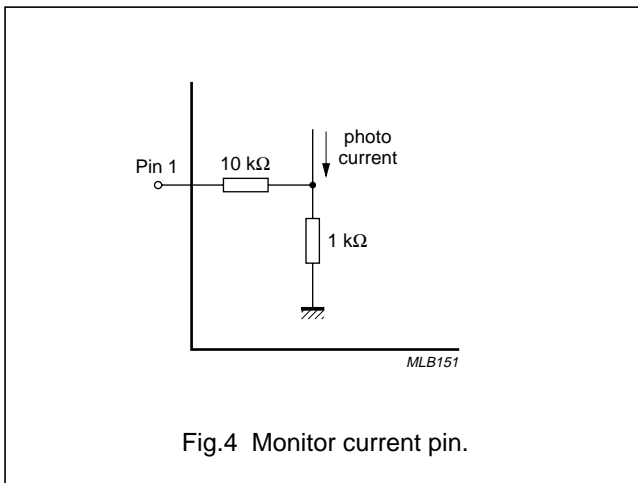


Fig.4 Monitor current pin.

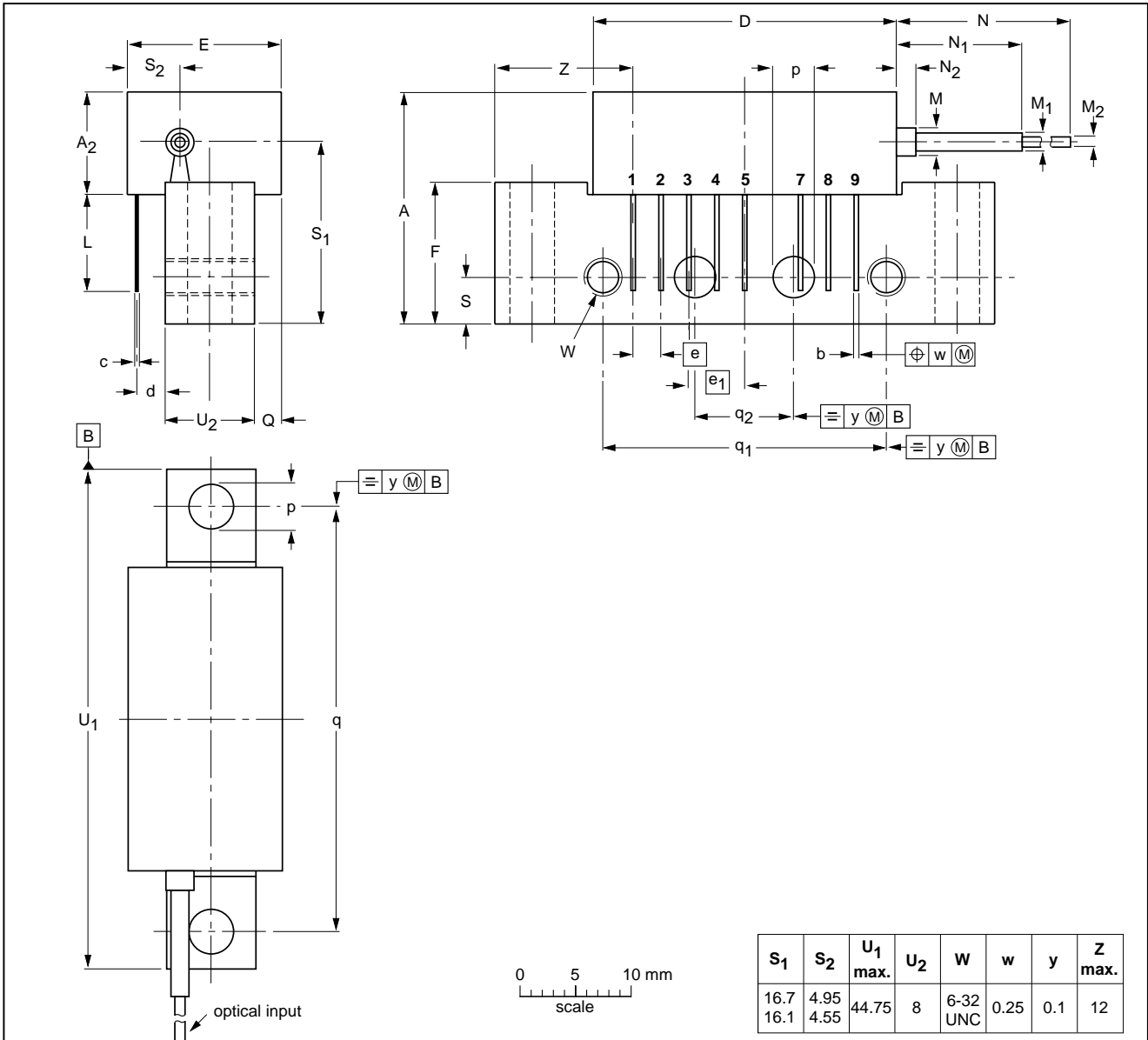
Optical receiver modules

BGO847; BGO847/FC0;  
BGO847/SC0

PACKAGE OUTLINES

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> max.	U <sub>2</sub>	W	w	y	Z max.
16.7	4.95	44.75	8	6-32 UNC	0.25	0.1	12
16.1	4.55						

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	9.1	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 8.7	5 1	4.15 3.85	2.4	38.1	25.4	10.2	4.2

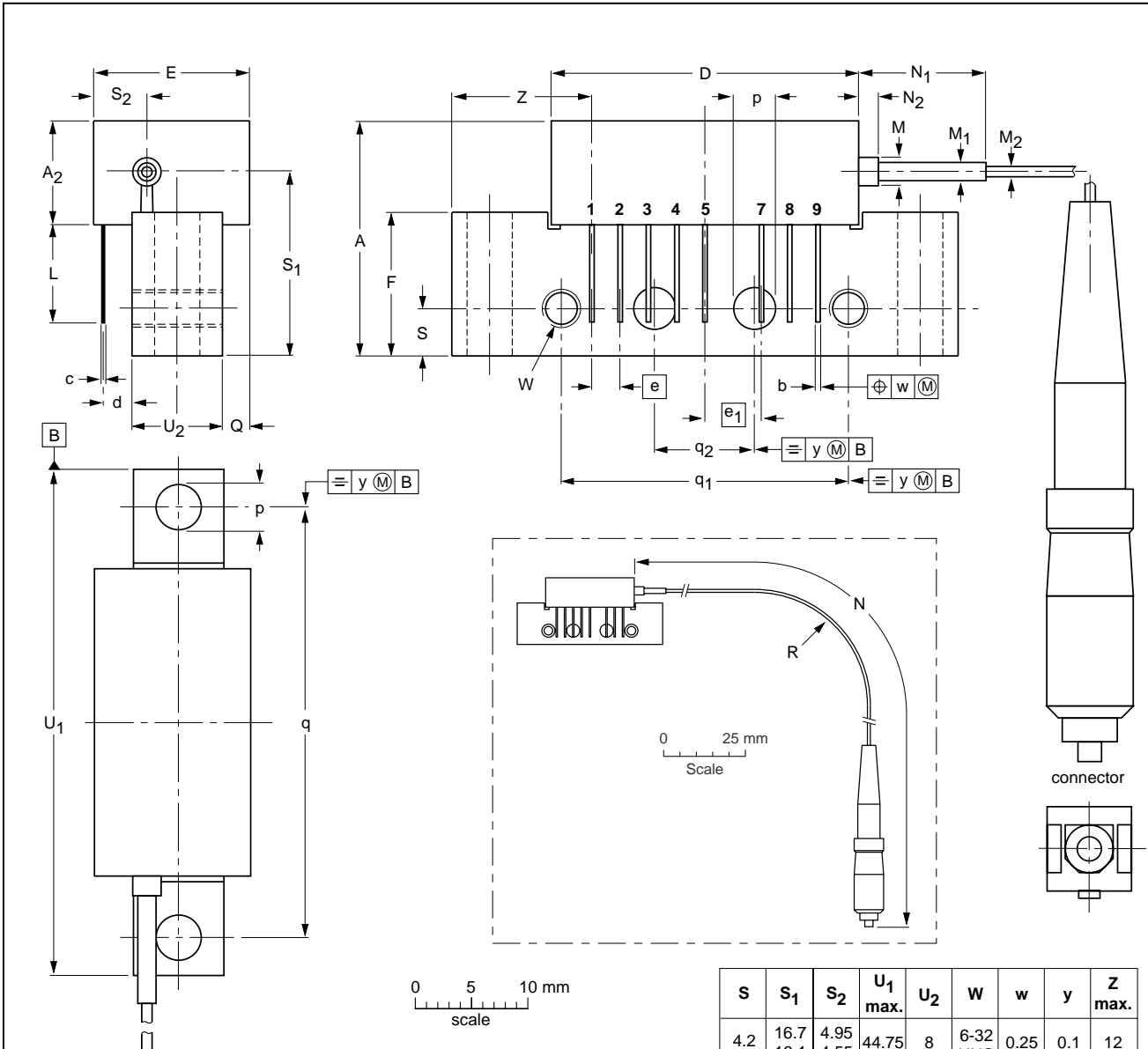
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	IEC	JEDEC	EIAJ			
SOT115T						99-04-13

Optical receiver modules

BGO847; BGO847/FC0;  
BGO847/SC0

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

SOT115'



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	N <sub>1</sub>	N <sub>2</sub>	p	Q max.	q	q <sub>1</sub>	q <sub>2</sub>	R min.
mm	20.8	9.1	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	861 746	10.7 8.7	5 1	4.15 3.85	2.4	38.1	25.4	10.2	35

S	S <sub>1</sub>	S <sub>2</sub>	U <sub>1</sub> max.	U <sub>2</sub>	W	w	y	Z max.
4.2	16.7 16.1	4.95 4.55	44.75	8	6-32 UNC	0.25	0.1	12

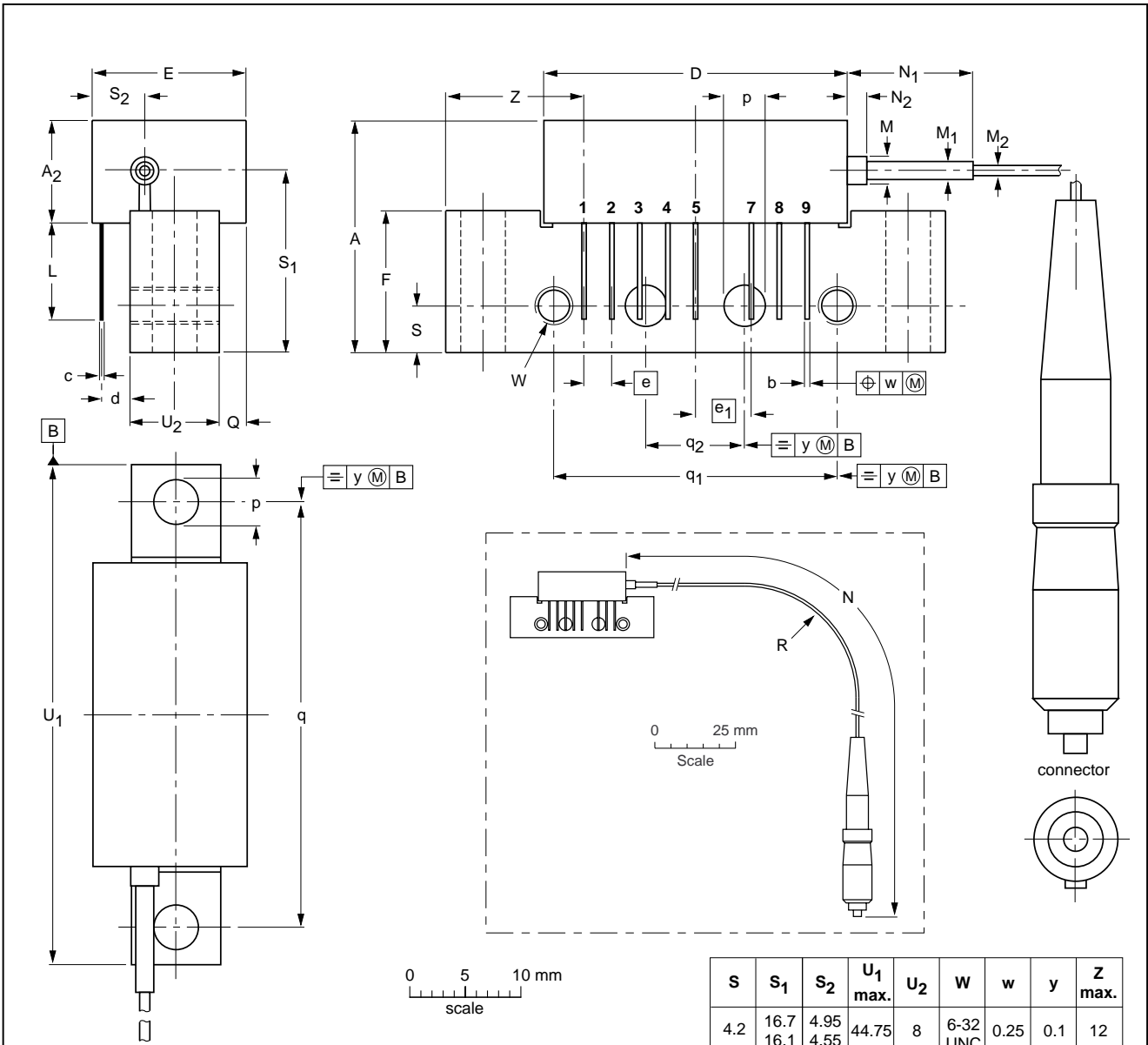
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT115Y						99-06-03- 00-01-06

Optical receiver modules

BGO847; BGO847/FC0;  
BGO847/SC0

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 <sub>1</sub>	S <sub>2</sub>	U <sub>1</sub> max.	U <sub>2</sub>	W	w	y	Z max.
4.2	16.7 16.1	4.95 4.55	44.75	8	6-32 UNC	0.25	0.1	12

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	N <sub>1</sub>	N <sub>2</sub>	p	Q max.	q	q <sub>1</sub>	q <sub>2</sub>	R min.
mm	20.8	9.1	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	861 746	10.7 8.7	5 1	4.15 3.85	2.4	38.1	25.4	10.2	35

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT115X					99-06-03- 00-01-06

## Optical receiver modules

BGO847; BGO847/FC0;  
BGO847/SC0

## DATA SHEET STATUS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS <sup>(1)</sup>
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
Preliminary specification	Qualification	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

## Note

1. Please consult the most recently issued data sheet before initiating or completing a design.

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**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.

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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.



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Optical receiver modules

BGO847; BGO847/FC0;  
BGO847/SC0

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**NOTES**

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Optical receiver modules

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**NOTES**

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Optical receiver modules

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**NOTES**

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