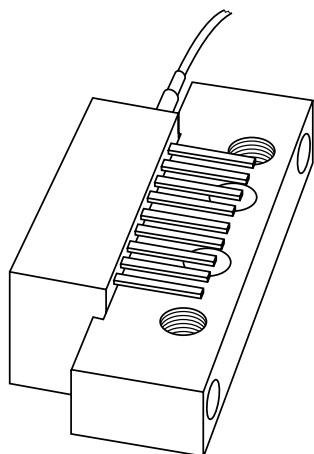


DATA SHEET



CGO869; CGO869/SC0 870 MHz optical receiver with integrated gain control

Product specification
Supersedes data of 2002 Sep 10

2002 Dec 10

870 MHz optical receiver
with integrated gain control

CGO869; CGO869/SC0

FEATURES

- Excellent linearity
- Extremely low noise up to 870 MHz
- Excellent flatness (straight line)
- Standard CATV outline
- Rugged construction
- Gold metallization ensures excellent reliability.

APPLICATIONS

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

DESCRIPTION

Hybrid high dynamic range optical receiver amplifier modules in a SOT115 package where the non-jacketed fibre has either no connector or an SC/APC connector. Two of the module pins are for connection to 24 V (DC), one for amplifier supply voltage and the other for the photodiode bias.

The modules contain a monomode optical input suitable for wavelengths from 1290 to 1600 nm, a terminal to monitor the photodiode current and an electrical output with an impedance of 75 Ω. The gain of the amplifier can be adjusted with one module pin.

PINNING

PIN	DESCRIPTION
1	monitor current
2, 3	common
4	+V _B of the photo diode
5	+V _B of the amplifier
6	V _C (gain control)
7, 8	common
9	output

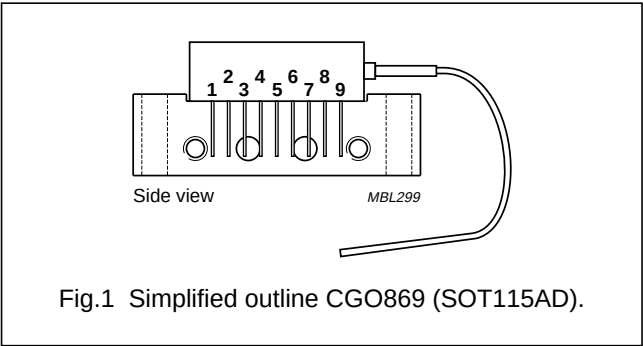


Fig.1 Simplified outline CGO869 (SOT115AD).

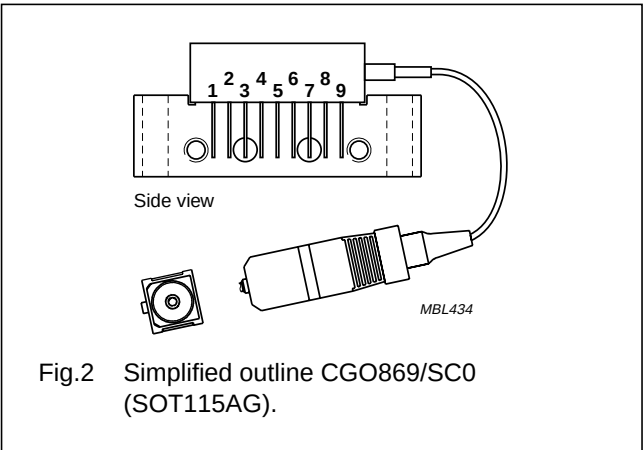


Fig.2 Simplified outline CGO869/SC0 (SOT115AG).

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.

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QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
f	frequency range		40	870	MHz
S_{22}	output return losses	f = 40 to 870 MHz	16	–	dB
	optical input return losses		45	–	dB
d_2	second order distortion	f = 854.5 MHz	–	–61	dB
F	equivalent input noise	f = 40 MHz	–	5	pA/ $\sqrt{\text{Hz}}$
I_{tot}	total current consumption (DC)	$V_B = 24 \text{ V}$	175	205	mA

HANDLING

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

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}	operating mounting base temperature		–20	+85	°C
P_{in}	optical input power	continuous	–	5	mW
ESD	ESD sensitivity	human body model; R = 1.5 k Ω ; C = 100 pF	500	–	V

CHARACTERISTICS

Bandwidth 40 to 870 MHz; $V_B = 24 \text{ V}$; $T_{\text{mb}} = 35 \text{ °C}$; $Z_L = 75 \text{ }\Omega$; gain control $V_C = 0 \text{ V}$.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
S	responsivity				
	CGO869	$\lambda = 1550 \text{ nm}$	2000	–	V/W
	CGO869/SC0	$\lambda = 1550 \text{ nm}$	1885	–	V/W
FL	flatness straight line	peak to valley; f = 40 to 870 MHz	–	1.1	dB
SL	slope straight line	f = 40 to 870 MHz	0	2	dB
S_{22}	output return losses	f = 40 to 870 MHz	16	–	dB
	optical input return losses		45	–	dB
d_2	second order distortion	$f_m = 54 \text{ MHz}$; notes 1 and 3	–	–74	dB
		$f_m = 446.5 \text{ MHz}$; notes 1 and 4	–	–66	dB
		$f_m = 548.5 \text{ MHz}$; notes 1 and 5	–	–66	dB
		$f_m = 746.5 \text{ MHz}$; notes 1 and 6	–	–64	dB
		$f_m = 854.5 \text{ MHz}$; notes 1 and 7	–	–61	dB

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SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
d_3	third order distortion	$f_m = 55.25$ MHz; notes 2 and 8	–	–76	dB
		$f_m = 445.25$ MHz; notes 2 and 9	–	–74	dB
		$f_m = 547.25$ MHz; notes 2 and 10	–	–73	dB
		$f_m = 745.25$ MHz; notes 2 and 11	–	–73	dB
		$f_m = 853.25$ MHz; notes 2 and 12	–	–69	dB
F	equivalent input noise	$f = 40$ to 750 MHz	–	5.5	pA/ $\sqrt{\text{Hz}}$
		$f = 750$ to 870 MHz	–	6.5	pA/ $\sqrt{\text{Hz}}$
S_λ	spectral sensitivity	$\lambda = 1310 \pm 20$ nm	0.85	–	A/W
		$\lambda = 1550 \pm 20$ nm	0.9	–	A/W
λ	optical wavelength		1290	1600	nm
L	length of optical fibre				
	CGO869	fibre; SM type; 9/125 μm	1	–	m
	CGO869/SC0	fibre; SM type; 9/125 μm	746	861	mm
I_{tot}	total current consumption (DC)		175	205	mA
I_{bias}	diode bias current at pin4 (DC)		–	25	mA

Notes

- Two laser test; each laser with 40% modulation index; $P_{\text{opt}} = 0.5$ mW (total).
- Three laser test; each laser with 60% modulation index; $P_{\text{opt}} = 0.5$ mW (total).
- $f_m = 54$ MHz; $f_p = 187.25$ MHz; $f_q = 133.25$ MHz.
- $f_m = 446.5$ MHz; $f_p = 97.25$ MHz; $f_q = 349.25$ MHz.
- $f_m = 548.5$ MHz; $f_p = 109.25$ MHz; $f_q = 439.25$ MHz.
- $f_m = 746.5$ MHz; $f_p = 133.25$ MHz; $f_q = 613.25$ MHz.
- $f_m = 854.5$ MHz; $f_p = 133.25$ MHz; $f_q = 721.25$ MHz.
- $f_m = 55.25$ MHz; $f_p = 109.25$ MHz; $f_q = 133.25$ MHz; $f_r = 187.25$ MHz.
- $f_m = 445.25$ MHz; $f_p = 193.25$ MHz; $f_q = 349.25$ MHz; $f_r = 97.25$ MHz.
- $f_m = 547.25$ MHz; $f_p = 217.25$ MHz; $f_q = 439.25$ MHz; $f_r = 109.25$ MHz.
- $f_m = 745.25$ MHz; $f_p = 133.25$ MHz; $f_q = 265.25$ MHz; $f_r = 613.25$ MHz.
- $f_m = 853.25$ MHz; $f_p = 133.25$ MHz; $f_q = 265.25$ MHz; $f_r = 721.25$ MHz.

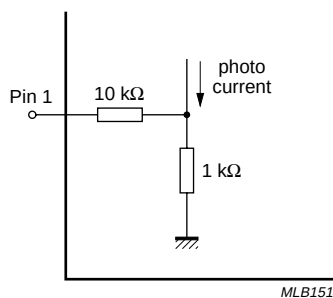


Fig.3 Monitor current pin.

870 MHz optical receiver with integrated gain control

CGO869; CGO869/SC0

Gain control

Bandwidth 40 to 870 MHz; $V_B = 24\text{ V}$; $T_{mb} = 35\text{ }^{\circ}\text{C}$; $Z_L = 75\text{ }\Omega$.

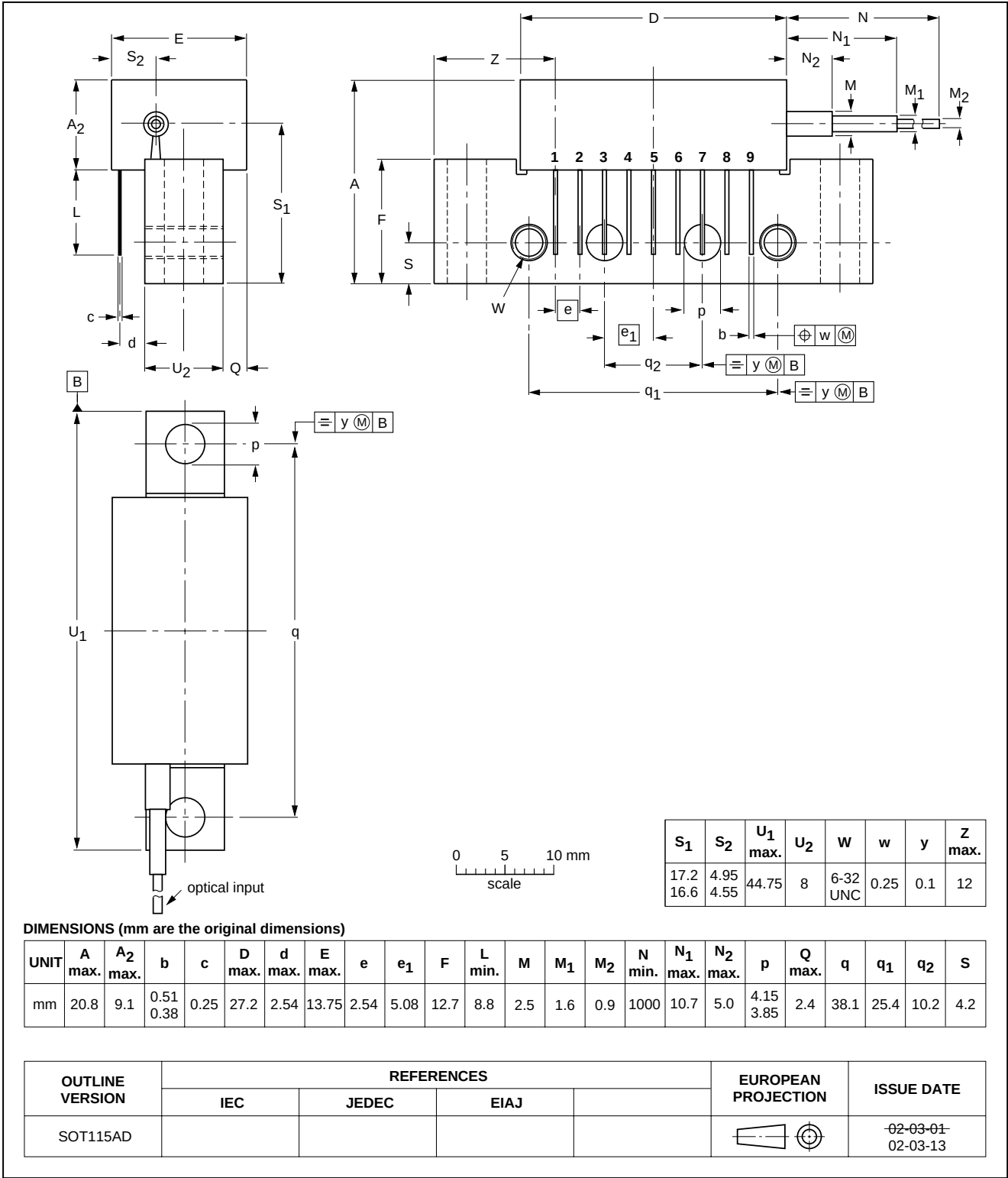
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
S	responsivity (CGO869)	$V_C = 0\text{ V}$; $f = 40\text{ MHz}$	2000	–	–	V/W
		$V_C = 24\text{ V}$; $f = 40\text{ MHz}$	900	–	–	V/W
G_V	electric gain control range		–	6.5	–	dB
$P_{in} = 0.5\text{ mW}$; $V_C = 0\text{ V}$						
V_o	output voltage (CGO869)	OMI = 4%; $f = 870\text{ MHz}$	29	–	–	dBmV
F	equivalent input noise	$f = 870\text{ MHz}$	–	–	6.5	$\text{pA}/\sqrt{\text{Hz}}$
CNR	carrier to noise ratio	OMI = 4%; $\text{RIN} = -155\text{ dB/Hz}$; $I_{PD} = 0.425\text{ mA}$; $\text{BW} = 5\text{ MHz}$	50.9	–	–	dB
$P_{in} = 0.75\text{ mW}$; $V_C = 12\text{ V}$						
V_o	output voltage (CGO869)	OMI = 4%; $f = 870\text{ MHz}$	29	–	–	dBmV
F	equivalent input noise	$f = 870\text{ MHz}$	–	–	12	$\text{pA}/\sqrt{\text{Hz}}$
CNR	carrier to noise ratio	OMI = 4%; $\text{RIN} = -155\text{ dB/Hz}$; $I_{PD} = 0.6\text{ mA}$; $\text{BW} = 5\text{ MHz}$	51.1	–	–	dB
$P_{in} = 1\text{ mW}$; $V_C = 24\text{ V}$						
V_o	output voltage (CGO869)	OMI = 4%; $f = 870\text{ MHz}$	29	–	–	dBmV
F	equivalent input noise	$f = 870\text{ MHz}$	–	–	17	$\text{pA}/\sqrt{\text{Hz}}$
CNR	carrier to noise ratio	OMI = 4%; $\text{RIN} = -155\text{ dB/Hz}$; $I_{PD} = 0.85\text{ mA}$; $\text{BW} = 5\text{ MHz}$	51.7	–	–	dB
$P_{in} = 0.5\text{ to }1\text{ mW}$						
d_2	second order distortion	OMI = 40%; $f_m = 854.5\text{ MHz}$; V_C adjusted to $V_{out} = 49\text{ dBmV}$	–	–	–61	dB
d_3	third order distortion	OMI = 60%; $f_m = 853.25\text{ MHz}$; V_C adjusted to $V_{out} = 49\text{ dBmV}$	–	–	–69	dB

870 MHz optical receiver
with integrated gain control

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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; 9 gold-plated in-line leads SOT115AD

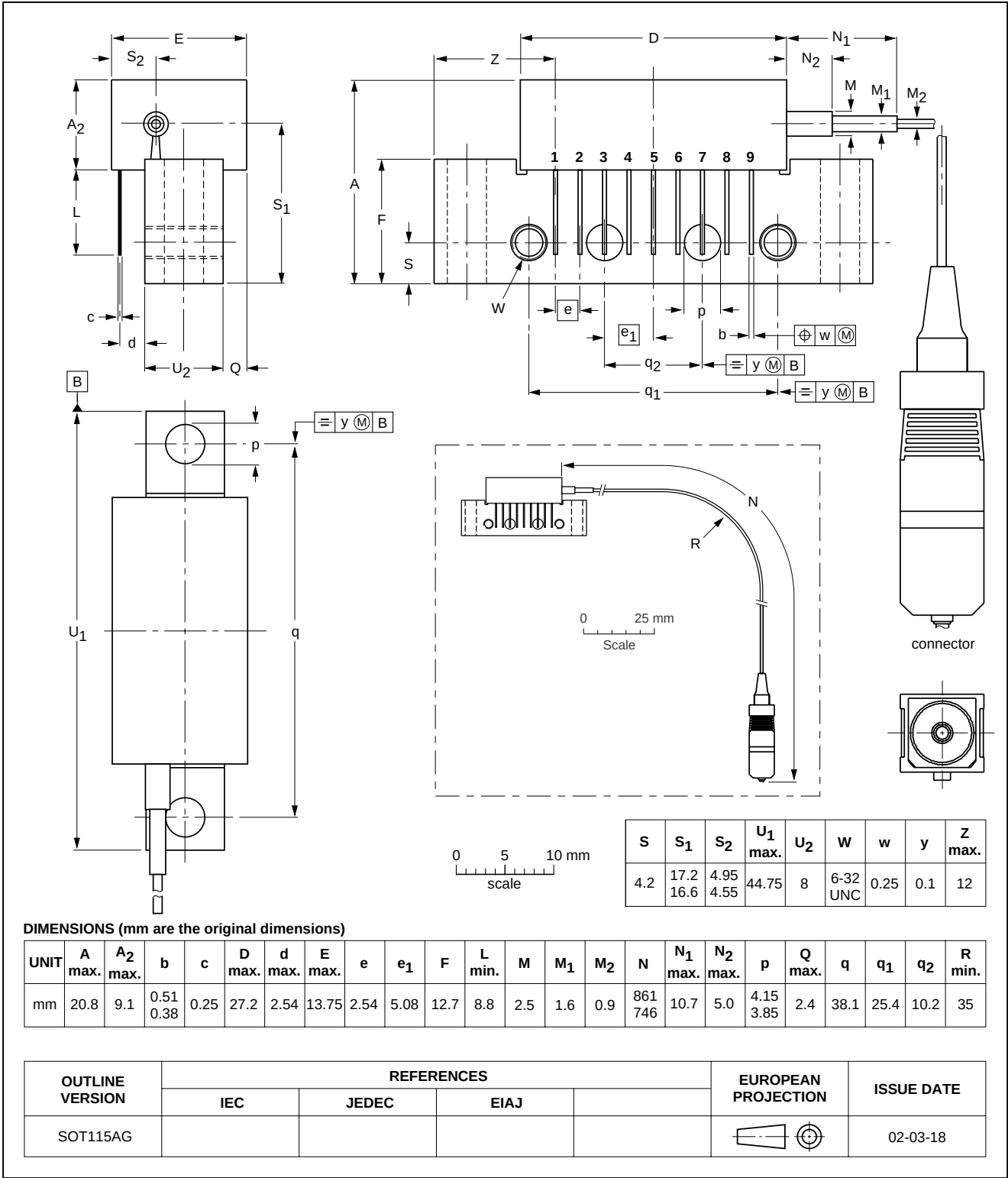


870 MHz optical receiver
with integrated gain control

CGO869; CGO869/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; 9 gold-plated in-line leads

SOT115AG



870 MHz optical receiver with integrated gain control

CGO869; CGO869/SC0

DATA SHEET STATUS

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NOTES

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NOTES

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Printed in The Netherlands

613518/06/pp12

Date of release: 2002 Dec 10

Document order number: 9397 750 10518

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