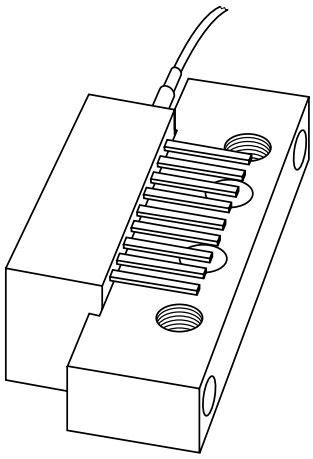
DATA SHEET



CGO869; CGO869/FC0; CGO869/SC0

Optical receiver modules

Preliminary specification

2002 Mar 01

Philips Semiconductors

PHILIPS

Optical receiver modules CGO869; CGO869/FC0; 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 has an FC/APC or 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 photo diode bias.
The modules contains a monomode optical input suitable for wavelengths from 1290 to 1600 nm, a terminal to monitor the photo diode 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	common
3	common
4	$+V_B$ of the photo diode
5	$+V_B$ of the amplifier
6	V_C (gain control)
7	common
8	common
9	output

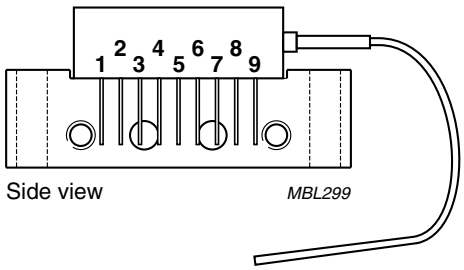


Fig.1 Simplified outline SOT115AD (CGO869).

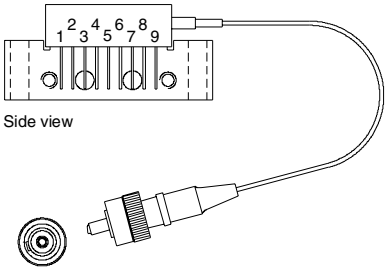


Fig.2 Simplified outline SOT115AF (CGO869/FC0).

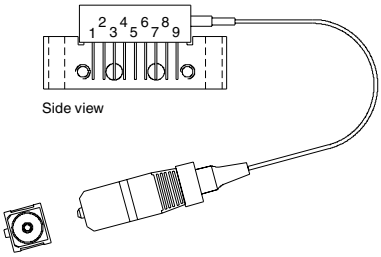


Fig.3 Simplified outline SOT115AG (CGO869/SC0).

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	dBc
F	equivalent input noise	f = 40 MHz	–	5	pA/√Hz
I_{tot}	total current consumption (DC)	V_B = 24 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 kΩ; C = 100 pF	500	−	V

CHARACTERISTICS

Bandwidth 40 to 870 MHz; V_B = 24 V; T_{mb} = 35 °C; Z_L = 75 Ω.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
S	responsivity				
	CGO869	λ = 1550 nm	2000	−	V/W
	CGO869/FC0, CGO869/SC0	λ = 1550 nm	1885	−	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_{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 MHz; notes 1 and 3	−	−71	dB
		f_m = 446.5 MHz; notes 1 and 4	−	−66	dB
		f_m = 548.5 MHz; notes 1 and 5	−	−66	dB
		f_m = 746.5 MHz; notes 1 and 6	−	−61	dB
		f_m = 854.5 MHz; notes 1 and 7	−	−61	dB
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	−	−71	dB
		f_m = 547.25 MHz; notes 2 and 10	−	−71	dB
		f_m = 745.25 MHz; notes 2 and 11	−	−71	dB
		f_m = 853.25 MHz; notes 2 and 12	−	−69	dB
F	equivalent input noise	f = 40 to 750 MHz	−	5.5	pA/√Hz
		f = 750 to 870 MHz	−	6	pA/√Hz
s_λ	spectral sensitivity	λ = 1310 ±20 nm	0.85	−	A/W
		λ = 1550 ±20 nm	0.9	−	A/W
λ	optical wavelength		1290	1600	nm

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
L	length of optical fibre				
	CGO869	fibre; SM type; 9/125 μm	1	–	m
	CGO869/FC0, CGO869/SC0	fibre; SM type; 9/125 μm	746	861	mm
I_{tot}	total current consumption (DC)		175	205	mA
$I_{pin\ 4}$	pin diode bias current (DC)		–	25	mA

Notes

1. Two laser test; each laser with 40% modulation index; P_{opt} = 0.5 mW (total).
2. Three laser test; each laser with 60% modulation index; P_{opt} = 0.5 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 .5MHz; 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;.

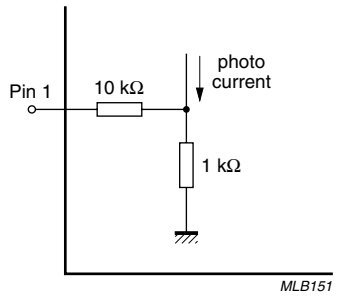


Fig.4 Monitor current pin.

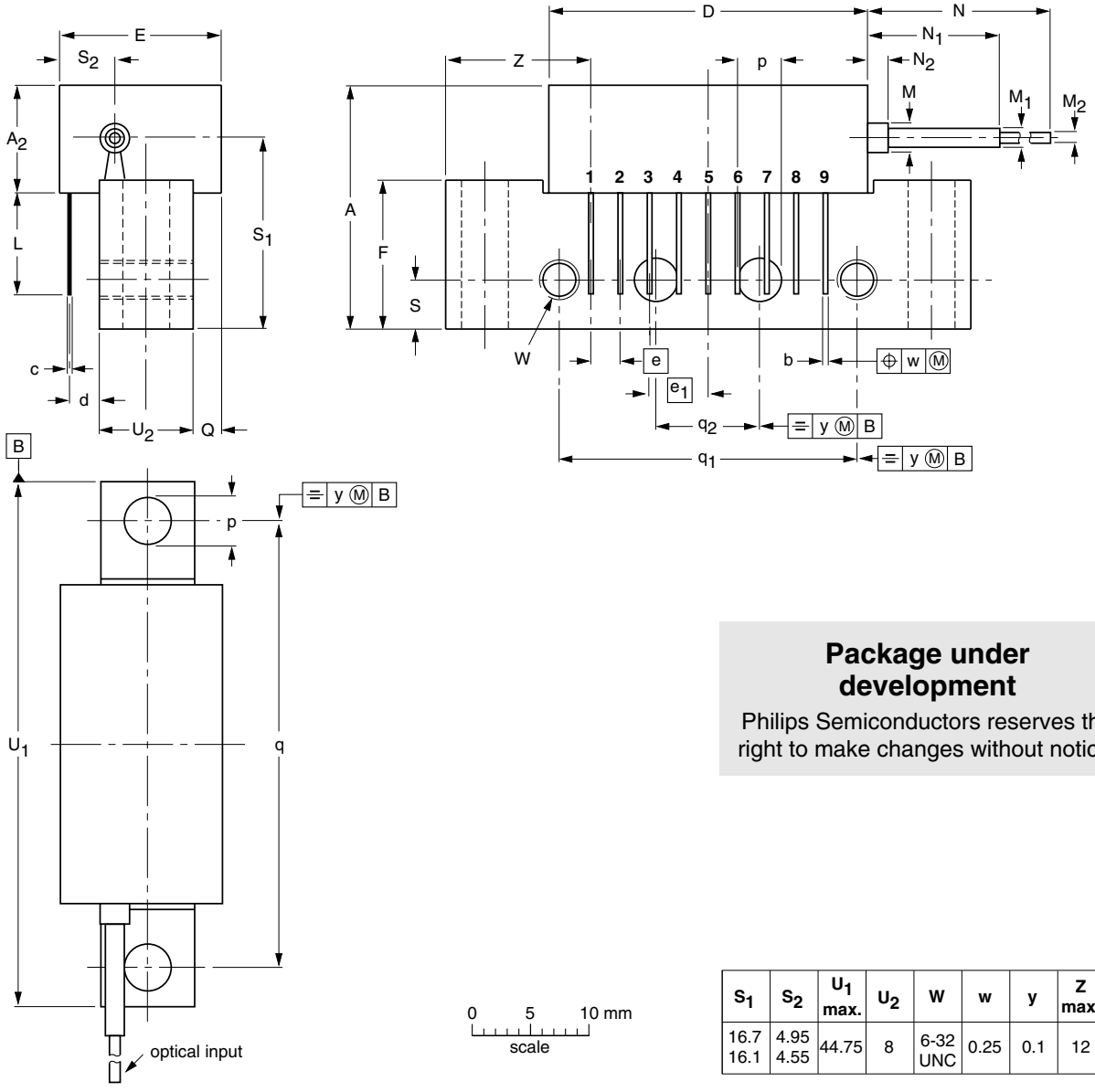
DESCRIPTION GAIN CONTROL

Bandwidth 40 to 870 MHz; V_B = 24 V; T_{mb} = 35 °C; Z_L = 75 Ω.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
S	responsivity (CGO869)	V_C = 0 V; f = 40 MHz	2000	–	–	V/W
		V_C = 24 V; f = 40 MHz	1000	–	–	V/W
	electric gain control range		–	6	–	dB
P_{in} = 0.5 mW; V_C = 0 V						
V_o	output voltage (CGO869)	OMI = 4 %; f = 870 MHz	29.0	–	–	dBmV
F	equivalent input noise	f = 870 MHz	–	–	6	pA/√Hz
CNR	carrier to noise ratio	OMI = 4 %; RIN = −155 dB/Hz; I_{PD} = 0.425 mA; BW = 5 MHz	51	–	–	dB
P_{in} = 0.75 mW; V_C = 12 V						
V_o	output voltage (CGO869)	OMI = 4 %; f = 870 MHz	29.0	–	–	dBmV
F	equivalent input noise	f = 870 MHz	–	–	12	pA/√Hz
CNR	carrier to noise ratio	OMI = 4 %; RIN = −155 dB/Hz; I_{PD} = 0.60 mA; BW = 5 MHz	51.1	–	–	dB
P_{in} = 1.0 mW; V_C = 24 V						
V_o	output voltage (CGO869)	OMI = 4 %; f = 870 MHz	29.0	–	–	dBmV
F	equivalent input noise	f = 870 MHz	–	–	18	pA/√Hz
CNR	carrier to noise ratio	OMI = 4 %; RIN = −155 dB/Hz; I_{PD} = 0.85 mA; BW = 5 MHz	51.5	–	–	dB
P_{in} = 0.5 mW to P_{in} = 1.0 mW						
d_2	second order distortion	OMI = 40 %; f_m = 854.5 MHz; V_C adjusted to V_{out} = 49 dBmV	–	–	−61	dB
d_3	third order distortion	OMI = 60 %; f_m = 853.25 MHz; V_C adjusted to V_{out} = 49 dBmV	–	–	−69	dB

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**



Package under development

Philips Semiconductors reserves the right to make changes without notice.

S_1	S_2	U_1 max.	U_2	W	w	y	Z max.
16.7 16.1	4.95 4.55	44.75	8	6-32 UNC	0.25	0.1	12

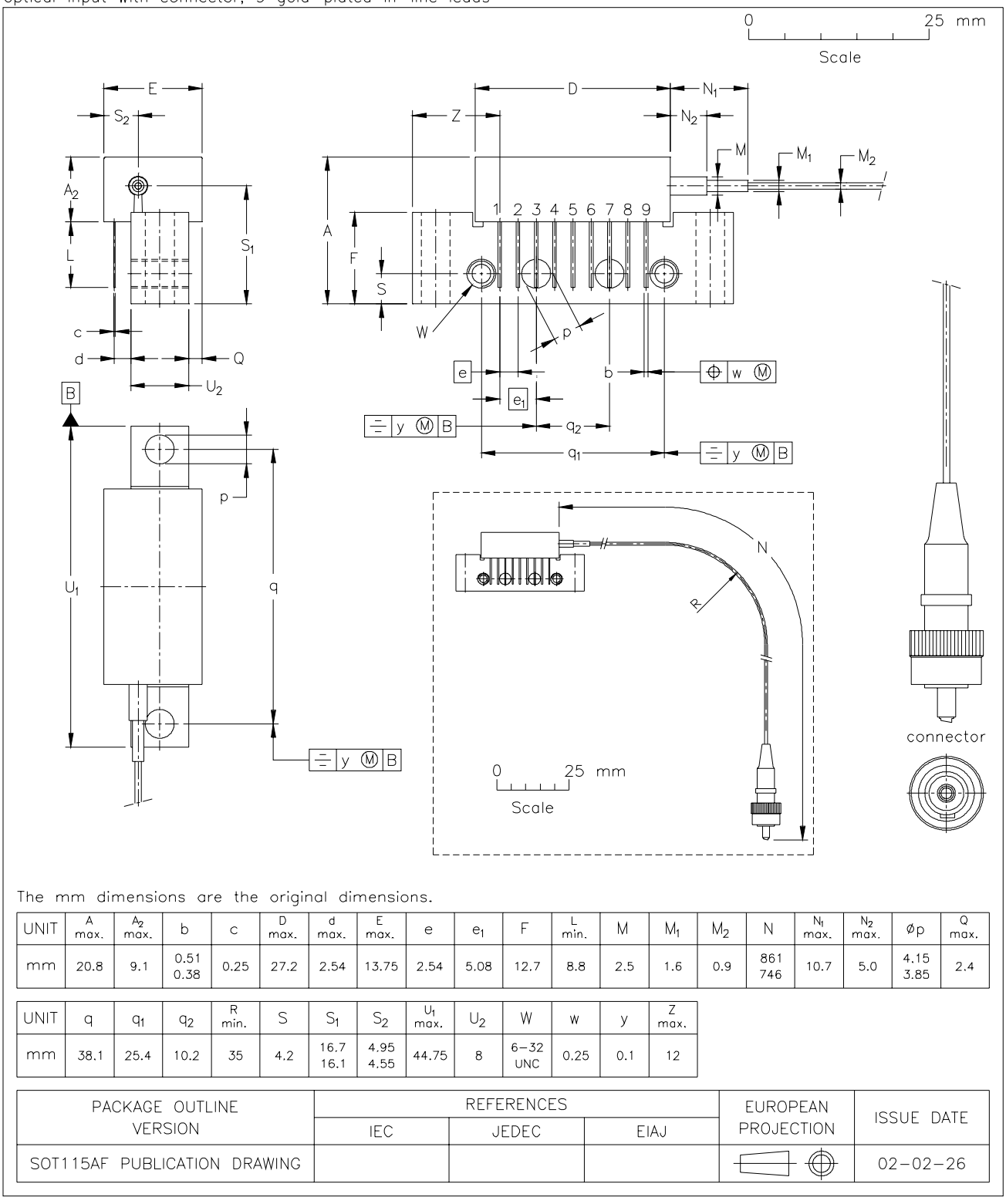
DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_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	9.1	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

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT115AD						01-03-09

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

SOT115AF



The mm dimensions are the original dimensions.

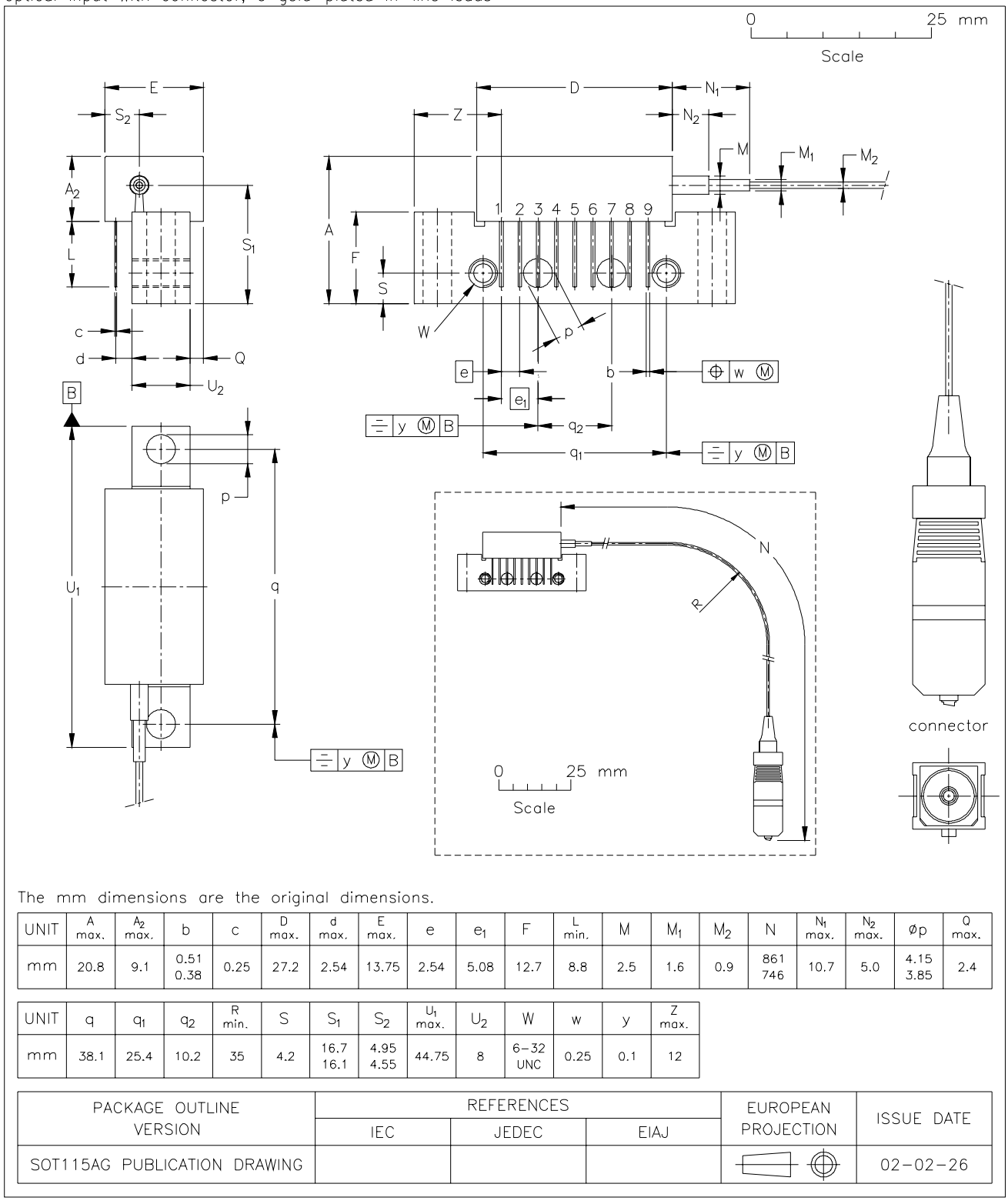
UNIT	A max.	A_2 max.	b	c	D max.	d max.	E max.	e	e_1	F	L min.	M	M_1	M_2	N	N_1 max.	N_2 max.	øp	Q max.
mm	20.8	9.1	0.51 0.38	0.25	27.2	2.54	13.75	2.54	5.08	12.7	8.8	2.5	1.6	0.9	861 746	10.7	5.0	4.15 3.85	2.4

UNIT	q	q_1	q_2	R min.	S	S_1	S_2	U_1 max.	U_2	W	w	y	Z max.
mm	38.1	25.4	10.2	35	4.2	16.7 16.1	4.95 4.55	44.75	8	6−32 UNC	0.25	0.1	12

PACKAGE OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT115AF PUBLICATION DRAWING					02−02−26

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



The mm dimensions 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 max.	N_2 max.	øp	Q max.
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	5.0	4.15 3.85	2.4

UNIT	q	q_1	q_2	R min.	S	S_1	S_2	U_1 max.	U_2	W	w	y	Z max.
mm	38.1	25.4	10.2	35	4.2	16.7 16.1	4.95 4.55	44.75	8	6−32 UNC	0.25	0.1	12

PACKAGE OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT115AG PUBLICATION DRAWING					02−02−26

DATA SHEET STATUS

DATA SHEET STATUS[1]	PRODUCT STATUS[2]	DEFINITIONS
Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A.

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2. The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

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Contact information

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