

# TECHNICAL REPORT



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## Optical amplifiers – Part 9: Semiconductor optical amplifiers (SOAs)

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## CONTENTS

|  |    |
|--|----|
| FOREWORD.....  | 4  |
| INTRODUCTION.....  | 6  |
| 1 Scope.....   | 7  |
| 2 Normative references .....   | 7  |
| 3 Terms, definitions, abbreviated terms and symbols.....   | 7  |
| 3.1 Terms and definitions.....   | 7  |
| 3.2 Abbreviated terms.....   | 8  |
| 3.3 Symbols.....   | 9  |
| 4 Specific features of SOAs.....   | 9  |
| 4.1 SOA chips.....   | 9  |
| 4.2 Gain ripple .....  | 12 |
| 4.3 Polarization dependent gain (PDG).....   | 13 |
| 4.3.1 General .....  | 13 |
| 4.3.2 Polarization insensitive SOAs .....  | 14 |
| 4.4 Noise figure (NF) .....  | 14 |
| 4.5 Lifetime of carriers .....   | 14 |
| 4.6 Nonlinear effects.....   | 14 |
| 5 Measurement of SOA output power and PDG .....  | 15 |
| 5.1 Narrow-band versus broadband light source .....  | 15 |
| 5.2 Recommended set-up for output power and PDG measurements .....                                       | 16 |
| 5.3 Examples of measurement results obtained by using the recommended set-up .....                       | 17 |
| Annex A (informative) Applications of SOAs.....  | 21 |
| A.1 General.....   | 21 |
| A.2 Polarization mode of SOAs .....  | 21 |
| A.3 Reach extender for GPON .....  | 21 |
| A.4 Pre-amplifier in transceivers for 100 Gbit Ethernet.....   | 21 |
| A.5 Monolithic integration of SOAs .....   | 22 |
| A.6 Reflective SOAs (RSOAs).....   | 22 |
| Bibliography.....  | 24 |
| Figure 1 – Schematic diagram of the typical SOA chip .....   | 10 |
| Figure 2 – Example of gain dependency on forward current of the SOA chip.....                            | 10 |
| Figure 3 – Schematic top view of a typical SOA chip with and without an angled waveguide structure ..... | 11 |
| Figure 4 – Schematic top view of the typical SOA module .....  | 12 |
| Figure 5 – Schematic diagram of the optical feedback inside the SOA chip.....                            | 12 |
| Figure 6 – Schematic diagram of gain ripple .....  | 13 |
| Figure 7 – Output power and PDG dependence on the wavelength of the SOA chip.....                        | 15 |
| Figure 8 – Recommended measurement set-up for optical power and PDG of SOA modules.....                  | 16 |
| Figure 9 – Recommended measurement set-up for optical power and PDG of SOA chips.....                    | 17 |
| Figure 10 – Optical power spectra of three different SOA chips.....                                      | 18 |
| Figure 11 – Output power and PDG of the SOA chip sample no. 1 as a function of $I_F$ .....               | 18 |

Figure 12 – Output power and PDG of the SOA chip sample no. 2 as a function of  $I_F$  ..... 19

Figure 13 – Output power and PDG of the SOA chip sample no. 3 as a function of  $I_F$ ..... 19

Figure A.1 – Schematic diagram of the receiver section of SOA-incorporated CFP transceivers ..... 22

Figure A.2 – Schematic diagram of the DFB-LDs-array type wavelength tuneable LD ..... 22

Figure A.3 – Schematic diagram of the seeded WDM-PON system ..... 23

# INTERNATIONAL ELECTROTECHNICAL COMMISSION

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## OPTICAL AMPLIFIERS –

### Part 9: Semiconductor optical amplifiers (SOAs)

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IEC TR 61292-9, which is a technical report, has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics.

This second edition cancels and replaces the first edition published in 2013. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) addition of new terms;
- b) clarification of noise figure definition.

The text of this technical report is based on the following documents:

|              |                  |
|--------------|------------------|
| Draft TR     | Report on voting |
| 86C/1465/DTR | 86C/1481/RVDTR   |

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61292 series, published under the general title *Optical amplifiers*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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## INTRODUCTION

Optical amplifiers (OAs) are necessary components as booster, line and pre-amplifiers for current optical network systems. IEC TC 86/SC 86C has published many standards for OAs, and most of them are focused on optical fibre amplifiers (OFAs), which are commonly deployed in commercial optical network systems. Recently, semiconductor optical amplifiers (SOAs) have attracted attention for applications in gigabit passive optical network (GPON) and 100 Gbit Ethernet (GbE) systems. This is because SOA chips are as small as laser diodes (LDs) and only require an electrical current.

Although SOAs for the 1 310 nm or 1 550 nm bands have been extensively studied since the 1980s, the use of SOAs is still limited to laboratories or field trials. This is due to specific performance features of SOAs such as gain ripple and polarization dependent gain (PDG). Thus, there are very few IEC standards addressing SOAs. One example is IEC TR 61292-3, which is a technical report for classification, characteristics and applications of OAs including SOAs. However, it only deals with general information on SOAs and does not contain the detail information on test methods that are necessary to measure precisely the particular parameters of SOAs.

This part of IEC 61292 provides a better understanding of specific features of SOAs as well as information on measuring gain and PDG. It is anticipated that future standards will address performance and test methodology.

## **OPTICAL AMPLIFIERS –**

### **Part 9: Semiconductor optical amplifiers (SOAs)**

#### **1 Scope**

This part of IEC 61292, which is a Technical Report, focuses on semiconductor optical amplifiers (SOAs), especially the specific features and measurement of gain and polarization dependent gain (PDG).

In this document, only the amplifying application of SOAs is described.

Other applications, such as modulation, switching and non-linear functions, are not covered.

Potential applications of SOAs, however, such as reflective SOAs (RSOAs) for the seeded wavelength division multiplexing passive optical network (WDM-PON), are briefly reviewed in Annex A.

#### **2 Normative references**

There are no normative references in this document.