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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 16849-2023

Replacing GB/T 16849-2008

Generic specification of optical amplifier

光放大器总规范

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Foreword

This document is in accordance with the provisions of GB/T 1:1-2020 "Guidelines for Standardization Work Part 1: Structure and Drafting Rules for Standardization Documents" drafting: This document replaces GB/T 16849-2008 "General Specification for Optical Fiber Amplifiers": Compared with GB/T 16849-2008, except for structural adjustment and Apart from editorial changes, the main technical changes are as follows:

--- Added some terms and definitions of optical amplifier parameters: operating wavelength band (see 3:3), doped fiber amplifier (see 3:4), array Erbium-doped fiber amplifier (see 3:5), multi-core erbium-doped fiber amplifier (see 3:6), semiconductor optical amplifier (see 3:7), Raman fiber amplifier amplifier (see 3:8), remote pump optical amplifier (see 3:12), single-channel optical amplifier (see 3:13), multi-channel optical amplifier (see 3:14), nominal working conditions (see 3:16), co-fiber pumping (see 3:66), foreign fiber pumping (see 3:67), remote pumping unit (see 3:68), remote gain unit (see 3:69), maximum allowable pump output power (see 3:70), minimum pump input power (see 3:71), reverse pumping (see 3:72), co-directional pumping (see 3:73), Raman pumping wavelength range (see 3:79), unamplified input light Power (see 3:80), splice loss (see 3:81), cross gain modulation isolation (see 3:88), gain ripple (see 3:91), gain slope rate (see 3:92), transient (see 3:93), reserved channel (see 3:94), saturated signal (see 3:95), download level (see 3:96), loading Rise time (see 3:97), download fall time (see 3:98), initial gain (see 3:99), final gain (see 3:100), gain offset difference (see 3:101), transient gain response time (see 3:102), transient gain overshoot (see 3:103), transient net gain overshoot (see 3:104), transient gain undershoot (see 3:105), transient net gain undershoot (see 3:106), maximum withstand power (see 3:112), box body Temperature (see 3:115), automatic pump power reduction (see 3:127);

--- Changed the definition of the term "gain" (see 3:15, 3:1:1:1 of the:2006 edition), and changed the term "wavelength change" to "gain change "(see 3:24, 3:1:1:9 of the:2006

edition), change the term "small signal gain wavelength variation" to "small signal gain variation" (see 3:1:1:10 of 3:25,:2006 edition), changed the definition of the term "small signal gain stability" (see 3:31,:2006 edition 3:1:1:8 of the:2006 edition), change the term "wavelength band" to "operating wavelength range" (see 3:33, 3:1:1:11 of the:2006 edition), and replace the:2006 edition Change "power level" to "power" (see 3:41, 3:48, 3:49, 3:112, 3:1:1:26, 3:1:1:33, 3:1:1:34, 3:1:1:66), changed the definition of the term "main polarization state" (see 3:64, 3:1:1:32 of the:2006 edition), and changed the term "net open- Changed the term "operating temperature" to "operating ring Ambient (airflow) temperature" (see 3:1:1:52 of the:2006 edition of 3:114);

--- Deleted some terms and definitions: power supply and control requirements (see 3:1:1:48 of the:2006 edition), gain cross saturation (see:2006 3:1:2:5 of the:2006 edition), mutual channel interference (see 3:1:2:6 of the:2006 edition), channel increase/decrease (steady-state) gain response (see:2006 version 3:1:2:9), channel increase/decrease instantaneous gain response (see:2006 version 3:1:2:10), channel increase/decrease instantaneous response time (see 3:1:2:11 of the:2006 edition), channel noise figure (see 3:1:2:12 of the:2006 edition), channel signal spontaneous emission noise Coefficient (see 3:1:2:13 of the:2006 edition), signal power behind the output connector (see 3:1:3:1:3 of the:2006 edition), working signal wavelength range (see 3:1:3:1:4 of the:2006 edition), output ASE power level (see 3:1:3:1:5 of the:2006 edition), maximum return Return light power (see 3:1:3:1:6 of the:2006 edition), input ASE power level (see 3:1:3:2:5 of the:2006 edition), equivalent total noise Index (see 3:1:4:11 of the:2006 edition);

--- Changed the abbreviations (see Chapter 4, 3:2 of the:2006 edition);

---In the classification of Chinese and English codes, the content of hybrid optical amplifier (HYFA) and remote pumped optical amplifier (ROPA) has been added (see 6:2);

---In the classification, the digital code deletes the contents of the transmitter with optical amplifier (OAT) and the receiver with optical amplifier (OAR) (see 5:2 of the:2006 edition);

--- Added environmental conditions, environmental compliance, laser safety, visual inspection and other requirements (see Chapter 7);

---Changed the requirements related to reliability and electromagnetic compatibility (see Chapter 8, Chapter 9, Chapter 7, Chapter 8, Chapter 9 of the:2006 edition): Please note that some contents of this document may refer to patents: The issuing agency of this document assumes no responsibility for identifying patents: This document is proposed by the Ministry of Industry and Information Technology of the People's Republic of China: This document is under the jurisdiction of the National Communications Standardization Technical Committee (SAC/TC485): This document is drafted by: China Information and Communication Technology Group Co:, Ltd:, China Academy of Information and Communications Technology, ZTE Corporation, Wuxi Dekeli Optoelectronics Technology Co:, Ltd: Drafters of this document: Fu Chengpeng, Chen Jun, Song Mengyang, Bu Qinlian,

Yu Chunping, Jiang Yi, Le Menghui, Zhao Wenyu, Wu Chengbin, Li Xianqin: The release status of previous versions of this document and the documents it replaces are as follows:

---First published as GB/T 16849-1997 in:1997;

---The first revision in:2008;

--- This is the second revision: General Specifications for Optical Amplifiers

1 Scope

GB/T 16849-2023 is the Chinese national standard on generic specification of optical amplifier, in the field of telecommunications and audio-video engineering. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 17 March 2023 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 October 2023. Classification: ICS 33.180.30, CCS M33. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document defines the terms and definitions of optical amplifiers (OA), specifies the classification and requirements of optical amplifiers, and describes the corresponding tests method: This document applies to rare earth element-doped active fiber OA devices, optical amplifier subsystems, and Raman fiber amplifiers (RFA) device design, development, production and testing:

2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text: Among them, dated references For documents, only the version corresponding to the date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to this document:

GB/T 26125-2011 Six restricted substances in electrical and electronic products (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls and polybrominated diphenyl ethers) Determination of

GB/T 26572-2011 Limit requirements for restricted substances in electrical and electronic products YD/T 1766-2016 Optical transceivers for optical communications - failure criteria for reliability tests of modules YD/T 3127-2016 Hybrid Fiber Amplifier ANSI/ESDA/JEDEC-JS-001-2017 Electrostatic Discharge Sensitivity Test Human Body

Model (HBM) Device Rating TelcordiaGR-63-CORE:2012 Network Equipment Manufacturing System Requirements: Physical Protection (NetworkEquipment-TelcordiaGR-468-CORE:2004 General Reliability Assurance Requirements for Optoelectronic Devices of Telecommunications Equipment (GenericReliability TelcordiaGR-1312-CORE::1999 General Specification for Optical Fiber Amplifiers and Proprietary DWDM Systems (GenericRequire-

3 Terms and Definitions

The following terms and definitions apply to this document: 3:1 input reference plane inputreferenceplane For lumped OA, n signals from transmitters Tx1, Tx2, , Txn each have a single wavelength lambda1, lambda2, , lambdan is multiplexed by an optical multiplexer (MUX) and delivered to the input of OA, as shown in Figure 1a):