

Photonic Integrated Circuit (IC) & Quantum Computing Market (2012 – 2022): By Application (Optical Fiber Communication, Optical Fiber Sensors, Biomedical); Components (Lasers, Attenuators); Raw Materials (Silica on Silicon, Silicon on Insulator)

<https://marketpublishers.com/r/P55DE4BA5A6EN.html>

Date: December 2012

Pages: 236

Price: US\$ 5,650.00 (Single User License)

ID: P55DE4BA5A6EN

Abstracts

Photonic Integrated circuits (PIC) is a breakthrough technology as it uses photons (smallest unit of light) as the data carrier instead of electrons (smallest unit of electricity) used in electronic ICs. As light travels at very high speeds, PIC technology is widely used to transfer huge amounts of data at a very high speed. Thus the PIC based products are primarily deployed in the field of optical fiber communications. Photonic integrated circuits market is growing at a phenomenal rate as it provides significant improvements in system size, power consumption, reliability and cost. The development of silicon photonics technology has helped in large scale manufacturing of PICs at low cost. Also current leading players have developed monolithically integrated Indium Phosphide (InP) based PICs that can integrate more than 600 components/functions in a single chip. Thus there is a huge competition in the market as each player is trying to innovate PIC based products which would be able to integrate large amounts of functions/components at low cost.

Optical sensors application is the other promising application in this market. It is used in fields like defense, aerospace, energy, transportation, medicine and other emerging fields. Quantum computing is another application of PICs which is forecasted to be commercialized in 2017. This technology is expected to completely revolutionize the computing industry. PICs are also used in biomedical field. InP-based application specific photonic ICs are being used for the diagnostic analysis of opaque skin tissue. The technique principally used here is Optical Coherence Tomography (OCT) or Raman Scatterometry.

At present North America has the largest market for PIC based products, especially in data centers and WAN applications of optical fiber communications. However, APAC is the largest player in the access network application of optical fiber communications right now. North America is the leader in PIC market with 49% market share however it is estimated that APAC will emerge as the market leader by 2022 growing at a CAGR of 35.9% from 2012 to 2022.

The report covers recent developments in the PIC industry like NeoPhotonics (U.S.) acquiring Santur Corporation (U.S.) in October 2011 and the acquisition of Opnext (U.S.) by Oclaro(U.S.). Several other acquisitions, mergers, new product launch, agreements etc. have taken place recently and are discussed in the report.

The growth of Photonic IC market is expected to be phenomenal with the revenue growth from \$150.4 million in 2012 to \$1,547.6 million by 2022, at an estimated CAGR of 26.3% from 2012 to 2022. The major players in the PICs industry are Infinera Corporation (U.S.), NeoPhotonics Corporation (U.S.), Oclaro (U.S.), Luxtera (U.S.), Kotura (U.S.), OneChip Photonics (CA) etc These players have played a great role in changing the market dynamics. For example Infinera has introduced 500 Gb/s PICs used in long haul flex coherent super channels. The main features of this product are simplicity, scalability, efficiency and reliability. On the other hand Neophotonics has developed an Optical Line Terminal Transceiver using Photonic Integrated Circuit Technology which is designed to lower the overall cost of FTTH network installation.

Scope of the report

This research report categorizes the global PIC market, based on integration, raw materials and applications; it also covers the forecasted revenue from 2012 to 2022 and future applications of PIC. It describes the deployments of PIC technology in various regions. The report describes the applications mapping of the PIC market with respect to the growth potential and adoption by the users.

On the basis of Integration

The global PIC market on the basis of integration consists of module, hybrid and monolithic PICs. The report covers the market of PICs based on these integration techniques across North America, Europe, Asia-Pacific, and ROW.

On the basis of Raw Materials

The PIC market has also been segregated based on raw materials used to fabricate PICs such as Lithium Niobate, Silica on Silicon, silicon on Insulator, Indium Phosphide and allium Arsenide.

On the basis of application areas

Application areas of Photonic Integrated Circuit have been categorized into Optical Fiber communication, optical fiber sensors, Biomedical and quantum computing. The market trend for these applications is discussed

On the basis of geography

Geographical analysis covers North America, Europe, Asia-Pacific, and ROW.

Contents

1 INTRODUCTION

- 1.1 KEY TAKE-AWAYS
- 1.2 REPORT DESCRIPTION
- 1.3 MARKETS COVERED
- 1.4 STAKEHOLDERS
- 1.5 RESEARCH METHODOLOGY
 - 1.5.1 MARKET SIZE
 - 1.5.2 KEY DATA POINTS TAKEN FROM PRIMARY SOURCES
 - 1.5.3 ASSUMPTIONS MADE FOR THIS REPORT
 - 1.5.4 LIST OF COMPANIES COVERED DURING STUDY

2 EXECUTIVE SUMMARY

3 MARKET OVERVIEW

- 3.1 INTRODUCTION
- 3.2 MARKET DEFINITION
- 3.3 EVOLUTION AND HISTORY OF PHOTONIC ICs
- 3.4 ADVANTAGES OF PHOTONIC ICs OVER CONVENTIONAL ICs
- 3.5 MARKET DYNAMICS
 - 3.5.1 DRIVERS
 - 3.5.1.1 Cost reduction
 - 3.5.1.2 Size reduction
 - 3.5.1.3 Increased functionality
 - 3.5.1.4 Higher power efficiency
 - 3.5.2 RESTRAINTS
 - 3.5.2.1 Lack of digitization
 - 3.5.2.2 Lack of standardization in the common fabrication and process techniques
 - 3.5.3 OPPORTUNITIES
 - 3.5.3.1 Photonic Computing
 - 3.5.4 BURNING ISSUE
 - 3.5.4.1 Lack of foundries
 - 3.5.5 WINNING IMPERATIVES
 - 3.5.5.1 Photons as the data carrier
- 3.6 PORTER'S FIVE FORCES MODEL
 - 3.6.1 INTENSITY OF THE RIVALRY

- 3.6.2 THREAT OF NEW ENTRANTS
- 3.6.3 THREAT OF SUBSTITUTES
- 3.6.4 BARGAINING POWER OF SUPPLIERS
- 3.6.5 BARGAINING POWER OF CUSTOMERS

4 PHOTONIC PROCESSORS

- 4.1 ABOUT PHOTONIC PROCESSOR
- 4.2 PHOTONIC PROCESSORS: OPTICAL VS ELECTRONIC PROCESSORS
- 4.3 FUTURE APPLICATIONS OF PHOTONIC PROCESSORS
 - 4.3.1 PHOTONIC COMPUTING
 - 4.3.1.1 Advantages of Photonic Computing
- 4.4 COMPONENTS OF PHOTONIC PROCESSORS
 - 4.4.1 OPTICAL TRANSISTOR
 - 4.4.2 OPTICAL GATE AND SWITCH
 - 4.4.2.1 Operation
 - 4.4.2.2 Types of Optical Switches
 - 4.4.2.3 Uses of Optical Switches
 - 4.4.3 HOLOGRAPHIC MEMORY
 - 4.4.3.1 Working Principle of Holography
 - 4.4.4 INPUT-OUTPUT DEVICES

5 PHOTONIC IC MARKET BY TYPE OF INTEGRATION

- 5.1 INTRODUCTION
- 5.2 HYBRID
- 5.3 MONOLITHIC
- 5.4 MODULE

6 PHOTONIC IC BY COMPONENTS

- 6.1 LASERS
 - 6.1.1 WORKING PRINCIPLE OF A LASER
- 6.2 MODULATORS
- 6.3 PHOTO DETECTORS
 - 6.3.1 IMPORTANT PROPERTIES OF PHOTO DETECTORS
- 6.4 ATTENUATORS
 - 6.4.1 FIXED FIBER-OPTIC ATTENUATORS
 - 6.4.2 BUILT-IN VARIABLE FIBER-OPTIC ATTENUATORS

6.4.3 VARIABLE FIBER-OPTIC TEST ATTENUATORS:
6.5 OPTICAL AMPLIFIERS

7 PHOTONIC IC MARKET BY RAW MATERIALS

7.1 INTRODUCTION
7.2 LITHIUM NIOBATE
7.3 SILICA-ON-SILICON
7.4 SILICON-ON-INSULATOR
7.5 GALIUM ARSENIDE
7.6 INDIUM PHOSPHIDE

8 PHOTONIC IC MARKET BY APPLICATIONS

8.1 INTRODUCTION
8.2 OPTICAL FIBER COMMUNICATIONS
8.3 OPTICAL FIBER SENSOR
8.4 BIOMEDICAL
8.5 QUANTUM COMPUTING
 8.5.1 COMPARISON OF CLASSICAL AND QUANTUM COMPUTING
8.6 OTHERS
 8.6.1 METROLOGY
 8.6.2 SUBMARINES

9 PHOTONIC IC MARKET BY GEOGRAPHY

9.1 INTRODUCTION
9.2 NORTH AMERICA
9.3 EUROPE
9.4 APAC
9.5 ROW

10 COMPETITIVE LANDSCAPE

10.1 LEADING COMPANIES IN PHOTONIC INTEGRATED CIRCUIT
10.2 KEY GROWTH STRATEGIES
10.3 NEW PRODUCT LAUNCH/DEVELOPMENT
10.4 MERGERS & ACQUISITIONS
10.5 PARTNERSHIPS/AGREEMENTS/STRATEGIC ALLIANCE/ COLLABORATION

11 COMPANY PROFILES (OVERVIEW, FINANCIALS, PRODUCTS & SERVICES, STRATEGY, & DEVELOPMENTS)

11.1 AGILENT TECHNOLOGIES

11.2 AIFOTEC AG

11.3 ALCATEL-LUCENT

11.4 AVAGO TECHNOLOGIES

11.5 CIENA CORPORATION

11.6 CYOPTICS

11.7 EMCORE CORPORATION

11.8 ENABLENCE TECHNOLOGIES

11.9 FINISAR CORPORATION

11.10 HEWLETT-PACKARD

11.11 INFINERA CORPORATION

11.12 INTEL CORPORATION

11.13 JDS UNIPHASE CORPORATION

11.14 KAIAM CORPORATION

11.15 KOTURA

11.16 LUXTERA

11.17 NEOPHOTONICS CORPORATION

11.18 OCLARO

11.19 ONECHIP PHOTONICS

11.20 TE CONNECTIVITY (Details on Financials, Product & Services, Strategy, & Developments might not be captured in case of unlisted companies)230

List Of Tables

LIST OF TABLES

TABLE 1 RESEARCH METHODOLOGY ADOPTED

TABLE 2 GLOBAL PHOTONIC IC MARKET REVENUE, BY APPLICATIONS, 2012 – 2022 (\$MILLION)

TABLE 3 GLOBAL PHOTONIC IC MARKET REVENUE, BY GEOGRAPHY, 2012 – 2022 (\$MILLION)

TABLE 4 GLOBAL PHOTONIC IC MARKET REVENUE, BY INTEGRATION, 2012 – 2022 (\$MILLION)

TABLE 5 GLOBAL PHOTONIC IC MARKET REVENUE, BY RAW MATERIALS, 2012 – 2022 (\$MILLION)

TABLE 6 ADVANTAGE OF PHOTONIC IC

TABLE 7 COMPARISON BETWEEN ELECTRONIC AND PHOTONIC IC

TABLE 8 TYPE OF OPTICAL SWITCHES

TABLE 9 HOLOGRAPHIC MEMORY VS CONVENTIONAL STORAGE DEVICES

TABLE 10 PHOTONIC IC MARKET REVENUE, BY INTEGRATION, 2012 – 2022 (\$MILLION)

TABLE 11 COMPARISON OF INTEGRATION TECHNIQUES

TABLE 12 GLOBAL HYBRID PHOTONIC IC MARKET REVENUE, BY GEOGRAPHY, 2012 – 2022 (\$MILLION)

TABLE 13 NORTH AMERICA: HYBRID PHOTONIC IC MARKET REVENUE, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 14 EUROPE: HYBRID PHOTONIC IC MARKET REVENUE, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 15 APAC: HYBRID PHOTONIC IC MARKET REVENUE, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 16 ROW: HYBRID PHOTONIC IC MARKET REVENUE, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 17 GLOBAL MONOLITHIC PHOTONIC IC MARKET REVENUE, BY GEOGRAPHY, 2012 – 2022 (\$MILLION)

TABLE 18 NORTH AMERICA: MONOLITHIC PHOTONIC IC MARKET REVENUE, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 19 EUROPE: MONOLITHIC PHOTONIC IC MARKET REVENUE, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 20 APAC: MONOLITHIC PHOTONIC IC MARKET REVENUE, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 21 ROW: MONOLITHIC PHOTONIC IC MARKET REVENUE, BY COUNTRY,

2012 – 2022 (\$MILLION)

TABLE 22 FEATURES OF DIFFERENT TYPE OF PHOTONIC INTEGRATION

TABLE 23 GLOBAL MODULE PHOTONIC IC MARKET REVENUE, BY GEOGRAPHY, 2012 – 2022 (\$MILLION)

TABLE 24 NORTH AMERICA: MODULE PHOTONIC IC MARKET REVENUE, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 25 EUROPE: MODULE PHOTONIC IC MARKET REVENUE, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 26 APAC: MODULE PHOTONIC IC MARKET REVENUE, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 27 ROW: MODULE PHOTONIC IC MARKET REVENUE, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 28 ADVANTAGE OF FIBER LASER

TABLE 29 ADVANTAGE OF CARBON DIOXIDE LASERS

TABLE 30 TYPE OF LASERS

TABLE 31 TYPES OF OPTICAL MODULATORS

TABLE 32 IMPORTANT ATTRIBUTES OF AMPLIFIERS

TABLE 33 GLOBAL PHOTONIC IC MARKET REVENUE, BY RAW MATERIALS, 2012 – 2022 (\$MILLION)

TABLE 34 LITHIUM NIOBATE PHOTONIC IC MARKET REVENUE, BY GEOGRAPHY, 2012 – 2022 (\$MILLION)

TABLE 35 SILICA-ON-SILICON PHOTONIC IC MARKET REVENUE, BY GEOGRAPHY, 2012 – 2022 (\$MILLION)

TABLE 36 APPLICATIONS OF PASSIVE COMPONENTS

TABLE 37 MAJOR PLAYER OF SILICON PHOTONICS

TABLE 38 SILICON-ON-INSULATOR PHOTONIC IC MARKET REVENUE, BY GEOGRAPHY, 2012 – 2022 (\$MILLION)

TABLE 39 GALLIUM ARSENIDE PHOTONIC IC MARKET REVENUE, BY GEOGRAPHY, 2012 – 2022 (\$MILLION)

TABLE 40 CHARACTERISTICS ASSOCIATED WITH RAW MATERIAL USED FOR PIC

TABLE 41 COMPONENTS USED IN DIFFERENT PIC

TABLE 42 INDIUM PHOSPHIDE PHOTONIC IC MARKET REVENUE, BY GEOGRAPHY, 2012 – 2022 (\$MILLION)

TABLE 43 PHOTONIC IC MARKET REVENUE, BY APPLICATIONS, 2012 – 2022 (\$MILLION)

TABLE 44 WAVELENGTH RANGE FOR OPTICAL FIBER COMMUNICATION

TABLE 45 PHOTONIC IC MARKET REVENUE FOR OPTICAL FIBER COMMUNICATION APPLICATION, BY GEOGRAPHY, 2012 – 2022 (\$MILLION)

TABLE 46 NORTH AMERICA: PHOTONIC IC MARKET REVENUE FOR OPTICAL FIBER COMMUNICATION APPLICATION, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 47 EUROPE: PHOTONIC IC MARKET REVENUE FOR OPTICAL FIBER COMMUNICATION APPLICATION, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 48 APAC: PHOTONIC IC MARKET REVENUE FOR OPTICAL FIBER COMMUNICATION APPLICATION, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 49 ROW: PHOTONIC IC MARKET REVENUE FOR OPTICAL FIBER COMMUNICATION APPLICATION, BY COUNTRY, 2012 – 2022 (\$MILLION)

TABLE 50 GLOBAL OPTICAL FIBER COMMUNICATION MARKET REVENUE, BY APPLICATIONS, 2012 – 2022 (\$BILLION)

TABLE 51 OPTICAL FIBER COMMUNICATION MARKET REVENUE FOR WAN APPLICATION, BY GEOGRAPHY, 2012 – 2022 (\$BILLION)

TABLE 52 OPTICAL FIBER COMMUNICATION MARKET REVENUE FOR DATACOM APPLICATION, BY GEOGRAPHY, 2012 – 2022 (\$BILLION)

TABLE 53 OPTICAL FIBER COMMUNICATION MARKET REVENUE FOR ACCESS APPLICATION, BY GEOGRAPHY, 2012 – 2022 (\$BILLION)

TABLE 54 PHOTONIC SENSORS MARKET REVENUE, BY GEOGRAPHY, 2012 – 2017 (\$BILLION)

TABLE 55 PHOTONIC IC MARKET REVENUE FOR OPTICAL FIBER SENSOR APPLICATION, BY GEOGRAPHY, 2012 – 2022 (\$MILLION)

TABLE 56 PHOTONIC IC MARKET REVENUE FOR BIOMEDICAL APPLICATION, BY GEOGRAPHY, 2012 – 2022 (\$MILLION)

TABLE 57 PHOTONIC IC MARKET REVENUE FOR QUANTUM COMPUTING APPLICATION, BY GEOGRAPHY, 2012 – 2022 (\$MILLION)

TABLE 58 SIGNIFICANT GROWTH OF APAC MARKET

TABLE 59 GLOBAL PHOTONIC IC MARKET REVENUE, BY GEOGRAPHY, 2012 – 2022 (\$MILLION)

TABLE 60 NORTH AMERICA: PHOTONIC IC MARKET REVENUE, BY INTEGRATION, 2012 – 2022 (\$MILLION)

TABLE 61 NORTH AMERICA: PHOTONIC IC MARKET REVENUE, BY APPLICATIONS, 2012 – 2022 (\$MILLION)

TABLE 62 NORTH AMERICA: PHOTONIC IC MARKET REVENUE, BY RAW MATERIALS, 2012 – 2022 (\$MILLION)

TABLE 63 EUROPE: PHOTONIC IC MARKET REVENUE, BY INTEGRATION, 2012 – 2022 (\$MILLION)

TABLE 64 EUROPE: PHOTONIC IC MARKET REVENUE, BY APPLICATIONS, 2012 – 2022 (\$MILLION)

TABLE 65 EUROPE: PHOTONIC IC MARKET REVENUE, BY RAW MATERIALS, 2012 – 2022 (\$MILLION)

TABLE 66 APAC: PHOTONIC IC MARKET REVENUE, BY INTEGRATION, 2012 – 2022 (\$MILLION)

TABLE 67 APAC: PHOTONIC IC MARKET REVENUE, BY APPLICATIONS, 2012 – 2022 (\$MILLION)

TABLE 68 APAC: PHOTONIC IC MARKET REVENUE, BY RAW MATERIALS, 2012 – 2022 (\$MILLION)

TABLE 69 ROW: PHOTONIC IC MARKET REVENUE, BY INTEGRATION, 2012 – 2022 (\$MILLION)

TABLE 70 ROW: PHOTONIC IC MARKET REVENUE, BY APPLICATIONS, 2012 – 2022 (\$MILLION)

TABLE 71 ROW: PHOTONIC IC MARKET REVENUE, BY RAW MATERIALS, 2012 – 2022 (\$MILLION)

TABLE 72 RANKING OF PIC BASED COMPANIES

TABLE 73 NEW PRODUCT LAUNCH/DEVELOPMENT (2009 – 2012)

TABLE 74 MERGERS & ACQUISITIONS (2009 – 2012)

TABLE 75 PARTNERSHIPS/AGREEMENTS/STRATEGIC ALLIANCE/COLLABORATION (2009 – 2012)

TABLE 76 PRODUCT OFFERED BY AGILENT TECHNOLOGIES

TABLE 77 AGILENT TECHNOLOGIES: OVERALL REVENUE, 2010 – 2012 (\$MILLION)

TABLE 78 AGILENT TECHNOLOGIES: OVERALL REVENUE, BY BUSINESS SEGMENTS, 2010 – 2011 (\$MILLION)

TABLE 79 ALCATEL-LUCENT: OVERALL REVENUE, 2010 – 2011 (\$MILLION)

TABLE 80 AVAGO TECHNOLOGIES : OVERALL REVENUE, 2010 – 2011 (\$MILLION)

TABLE 81 PRODUCT PORTFOLIO OF CIENA CORPORATION

TABLE 82 CIENA CORPORATION: OVERALL REVENUE, 2010 – 2011 (\$MILLION)

TABLE 83 CYOPTICS : OVERALL REVENUE, 2009 – 2010 (\$MILLION)

TABLE 84 PRODUCT OFFERED BY EMCORE CORPORATION

TABLE 85 EMCORE CORPORATION: OVERALL REVENUE, 2010 – 2011 (\$MILLION)

TABLE 86 ENABLENCE TECHNOLOGIES : OVERALL REVENUE, 2010 – 2012 (\$MILLION)

TABLE 87 PRODUCT PORTFOLIO OF FINISAR CORPORATION

TABLE 88 FINISAR CORP: OVERALL REVENUE, 2011 – 2012 (\$MILLION)

TABLE 89 PRODUCT OFFERINGS OF HP

TABLE 90 HP: OVERALL REVENUE, 2010 – 2011 (\$MILLION)

TABLE 91 INFINERA CORPORATION: OVERALL REVENUE, 2010 – 2011 (\$MILLION)

TABLE 92 INFINERA CORPORATION: MARKET REVENUE BY GEOGRAPHY, 2010 – 2011 (\$MILLION)

TABLE 93 INTEL PRODUCTS & THEIR RANGE

TABLE 94 PRODUCT PORTFOLIO OF INTEL CORPORATION

TABLE 95 INTEL CORPORATION: OVERALL REVENUE, 2010 – 2011(\$MILLION)

TABLE 96 JDS UNIPHASE CORPORATION: OVERALL REVENUE, 2010 – 2012
(\$MILLION)

TABLE 97 PRODUCT OFFERINGS OF NEOPHOTONICS CORPORATION

TABLE 98 NEOPHOTONICS CORPORATION: OVERALL REVENUE, 2010 – 2011
(\$MILLION)

TABLE 99 NEOPHOTONIC CORPORATION: MARKET REVENUE, BY COUNTRY,
2010 – 2011 (\$MILLION)

TABLE 100 OCLARO : OVERALL REVENUE, 2010 – 2012 (\$MILLION)

TABLE 101 OCLARO: MARKET REVENUE, BY COUNTRY, 2010 – 2012 (\$MILLION)

TABLE 102 TE CONNECTIVITY : OVERALL REVENUE, 2009 – 2011 (\$MILLION)

TABLE 103 TE CONNECTIVITY: MARKET REVENUE, BY GEOGRAPHY, 2009 – 2011
(\$MILLION)

TABLE 104 TE CONNECTIVITY: MARKET REVENUE, BY BUSINESS SEGMENT,
2009 – 2011 (\$MILLION)

List Of Figures

LIST OF FIGURES

- FIGURE 1 STEPS IN RESEARCH METHODOLOGY
- FIGURE 2 PHOTONIC IC MARKET RESEARCH STRATEGY
- FIGURE 3 OVERVIEW OF PHOTONIC IC MARKET
- FIGURE 4 EVOLUTION OF PICS
- FIGURE 5 IMPACT ANALYSIS OF DRIVERS OF PIC
- FIGURE 6 PACKAGING OF PHOTONIC IC AND ELECTRONIC IC
- FIGURE 7 SIZE OF PHOTONIC INTEGRATED CIRCUIT AND ELECTRONIC INTEGRATED CIRCUIT
- FIGURE 8 PIC INCORPORATED WITH OPTICAL DEVICES OF DIFFERENT FUNCTIONS
- FIGURE 9 IMPACT ANALYSIS OF RESTRAINTS OF PIC
- FIGURE 10 PORTER'S FIVE FORCE MODEL
- FIGURE 11 OPTICAL PROCESSOR
- FIGURE 12 PHOTONIC PROCESSOR VS ELECTRONIC PROCESSOR
- FIGURE 13 SINGLE-MOLECULE OPTICAL TRANSISTOR
- FIGURE 14 UNDERLYING PRINCIPLE BEHIND DEVELOPING A TRANSISTOR
- FIGURE 15 OPTICAL SWITCH
- FIGURE 16 SETUP OF A SIMPLE OPTICALLY PUMPED LASER
- FIGURE 17 OPTICAL MODULATORS
- FIGURE 18 PHOTO DETECTOR
- FIGURE 19 OPTICAL ATTENUATOR
- FIGURE 20 SETUP OF A MULTIPASS FEMTOSECOND AMPLIFIER
- FIGURE 21 LITHIUM NIOBATE
- FIGURE 22 SILICA ON SILICON
- FIGURE 23 SILICON OR SILICON-ON-INSULATOR
- FIGURE 24 GALLIUM ARSENIDE
- FIGURE 25 INDIUM PHOSPHIDE
- FIGURE 26 OPTICAL FIBER SENSING SYSTEM
- FIGURE 27 CLASSIFICATION OF OPTICAL FIBER SENSORS
- FIGURE 28 PIC-BASED OPTICAL SENSOR FOR HELICOPTER ROTOR BLADE MONITORING
- FIGURE 29 DISTRIBUTED SENSING OF STRAIN AND TEMPERATURE USING AN OPTICAL FIBER AS SENSOR
- FIGURE 30 KEY GROWTH STRATEGIES

I would like to order

Product name: Photonic Integrated Circuit (IC) & Quantum Computing Market (2012 – 2022): By Application (Optical Fiber Communication, Optical Fiber Sensors, Biomedical); Components (Lasers, Attenuators); Raw Materials (Silica on Silicon, Silicon on Insulator)

Product link: <https://marketpublishers.com/r/P55DE4BA5A6EN.html>

Price: US\$ 5,650.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

info@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/P55DE4BA5A6EN.html>

To pay by Wire Transfer, please, fill in your contact details in the form below:

First name:
Last name:
Email:
Company:
Address:
City:
Zip code:
Country:
Tel:
Fax:
Your message:

****All fields are required**

Customer signature _____

Please, note that by ordering from marketpublishers.com you are agreeing to our Terms & Conditions at <https://marketpublishers.com/docs/terms.html>

To place an order via fax simply print this form, fill in the information below

and fax the completed form to +44 20 7900 3970